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VOLUME 7 NUMBER 21 DECEMBER 13, 1988

25 Information Organizers That Work the Way You Do

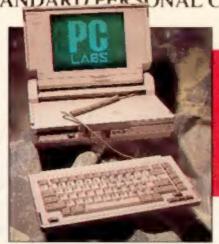
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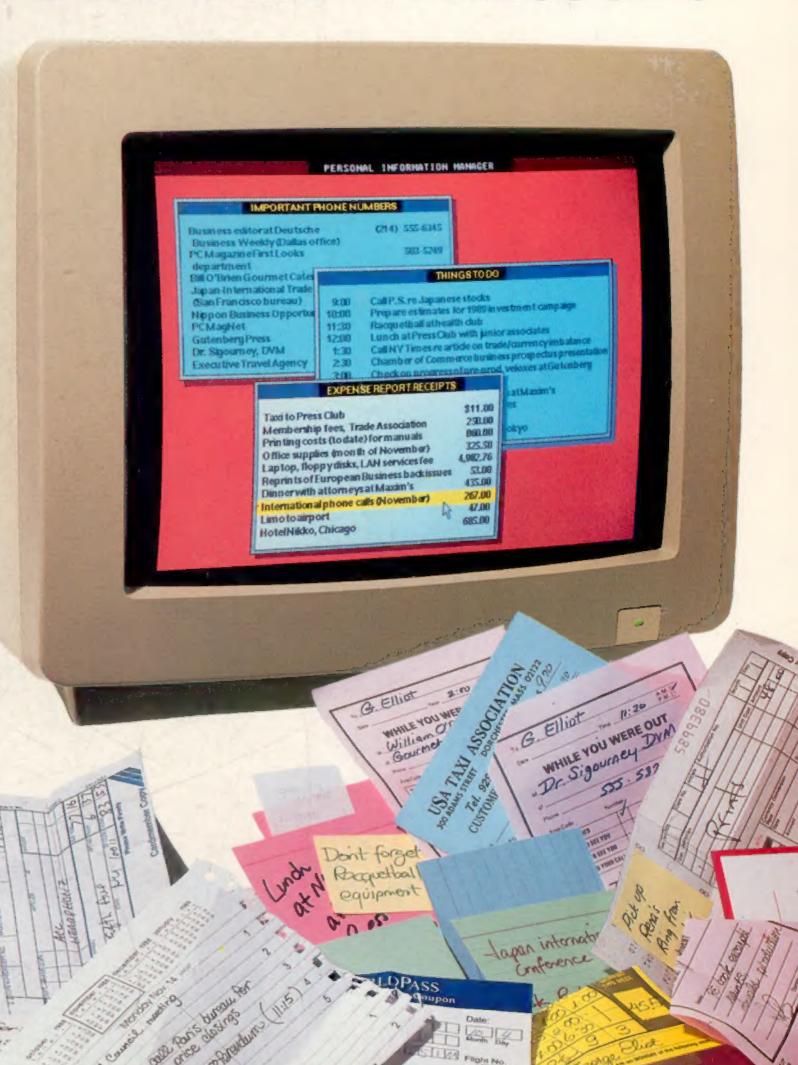
TANDARD PERSONAL COMPUTING



Compaq's SLT/286 Portable — Does Great Technology Make It the Laptop Leader?

Personal Information Managers

Cut the Clutter!



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This is for ey too busy to get

If you're the type of person who's too busy to read an ad, read this ad.

Because you'll learn about a new tool that will help you manage people, ideas,

You can record the thousands of tasks you need to address to put together a new prodile Van Collegey Priet Uillijf Spalen Out
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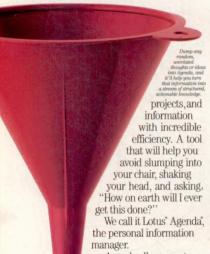
Items. Dump information in manually, import it or use our pop-up capability while in another program.

uct line. Or the thousands of factors you need to put together a new bottom line. Agenda will not only file these random

items of information for you, it'll help you arrange them any way you want. So you can understand them better.

So you can understand them better, formulate new ideas better and extract all the answers you need better.

Which means, now you can concentrate



Agenda allows you to dump random facts, thoughts, and ideas into your PC without having to structure the information in advance.

Agenda's filing system is a more sophisticated version of this filing system. You can put thems anywhen you want. View them any way you want. And have access to them anytime you want.



eryone who's any work done.



Categories. Agenda files items in all relevant categories so you can always find the information you need.

File: Ct: AGENDA FILES ISSUES 06/21/88 11:00

View. Essues by Person

Basses Joan Priorey When

- Research

- Decision needed on - High - 06/25/88 research budget by end of this week - discuss options with Jim and Joan.

- Competitive Tracking - Forward product comparison - Low articles to Joan.

- Destribution - Do Tom and Bob think we need to adjust distribution mix?

- Both will present tim-point - Medium - 06/25/88 reconference.

Views. Looking at the same information through different views gives you a more informed perspective. different ways so you can pinpoint information that's important to you. Or discover new relationships you hadn't considered before. And anytime you change an item in a view, Agenda will

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The whole idea behind Agenda is to get them all in a row.

into your PC and assign them to categories that you create.

Then Agenda will do all of your filing automatically. And thanks to Agenda's *multiple filing capabilities*, if the information is relevant in more than one place, Agenda will take it and put it in several categories at once.

This makes it easy to view your data in

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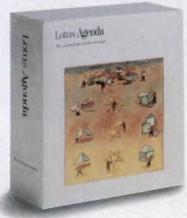
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All of which means, from now on you'll be able to come in every morning, check your Agenda, and get right to work.

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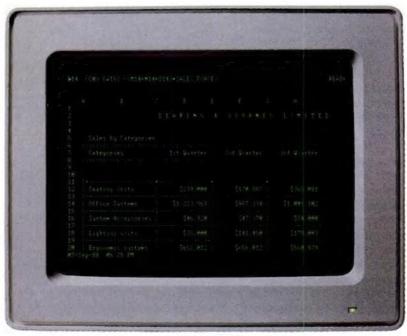


Introducing Lotus Agenda

What you've been doing.



On your 286, you've been making any task look complicated.



On your 386, it hasn't been incredibly exciting having all that power.

If the screens on the right look more intriguing to you than those on the left, you're ready for Microsoft® Windows.

Windows opens up the world of visual thinking to all 286 and 386 owners by offering the power of graphics.

Everything you can do on your PC, you can now do better, faster and with greater imagination. Whether you're creating documents or trying to get a clearer picture of your work.

What used to take complicated keystrokes can now be accomplished with the simple click of a mouse. With Microsoft Windows, you access pull-down menus. Simultaneously work with different programs as well as cut and paste between them to create graphic examples within different bodies of text. And what you see on the screen will appear on your printed page.

And once you've learned Microsoft Windows, you'll have the basis for scores of other programs because all the countless new Windows applications are based on the same easy, logical format.

Since Microsoft Windows virtually looks and works like MS® OS/2
Presentation Manager, you won't have to worry about it becoming obsolete in a couple years. We made both systems compatible. So,
in the future, you'll Solve the playing with a simple point and click with the Microsoft Mouse.

Now cutting and passing is a simple point and click with the Microsoft Mouse.

of Windows will give you a jump on learning MS OS/2 Presentation Manager. You'd expect a program this powerful

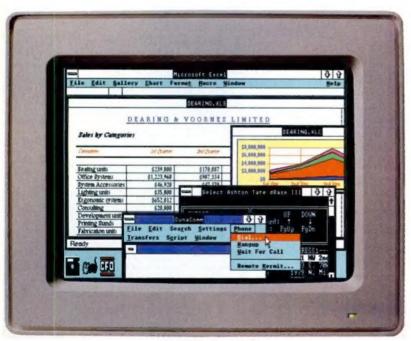
You'd expect a program this powerful to require a more powerful machine. But we consistently create software that makes

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What you could have been doing.



With Windows/286, you could have been seeing things much more clearly.



With Windows/386, you could have been seeing a lot more things much more clearly.

the best use of your present hardware.
For example, Microsoft Windows/
286 will work with as little as 640K and

instantly make your machine more sensitive, intuitive and highly visual. It gives you the ability to run every Windows application available. And with access to all those

powerful programs, you'll be able to extend the life and usefulness of your 286 well beyond the introduction of MS OS/2 Presentation Manager. With version 2.1 you also get the benefit of increased speed. So you'll blaze through Windows applications up to 87% faster.

Microsoft Windows/386 will give you everything that Windows/286 gives you. Plus multitasking with most DOS applications. Now you can finally utilize the speed and power of any 386 machine.

Imagine creating a complicated spreadsheet. Then while a macro is being run, open up a word processor. Type a document, open and

work with a graphics program. Cut and

paste between programs and even call up electronic mail. And still be able to check on the status of your spreadsheet at any time.

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What have you been doing without it?



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Fast
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with integral
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editing

for the files and programs you're using now —

for DOS and OS/2

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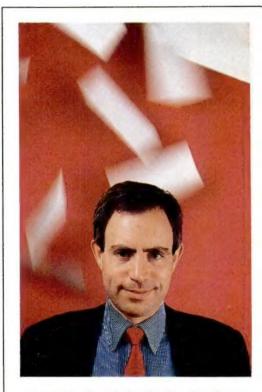
For most of his professional life, contributing editor Edward Mendelson has taught English literature at Columbia University, adding inexhaustibly to the body of critical literature that exists on the work of the poet W. H. Auden. These days, most of Mendelson's research time has been spent not in the Morningside Heights campus's Butler Library studying poetry, but in One Park Avenue's PC Labs writing macros that make the job of addressing and printing envelopes on the Hewlett-Packard LaserJet family of printers as effortless as possible. The result of his extracurricular labors is our feature story "Printing the Perfect Envelope."

If you've never tried to coax, bribe, or threaten your LaserJet into printing an envelope, you might be under the false impression that commanding it to do so is a trivial matter. In fact, like Mendelson, the majority of

PC users have learned the hard way that just the opposite is true, sometimes going through a hundred or more envelopes before stumbling on the right combination of keystrokes and commands. "Almost every other day, someone on CompuServe asks for a macro to help with envelope addressing," says Mendelson. "Some WordPerfect macros do exist on CompuServe, but it seemed like it was time that people could look to one source for macros written for all the major word processors—Microsoft Word, DisplayWrite 4, MultiMate Advantage, XyWrite III Plus—not just for WordPerfect."

Mendelson went even further than that:
he wrote macros for two keyboard macro
programs as well as a handy DOS batch
file that allows you to print an envelope

Mendelson
coauthor
entitled
think so.



Edward the Great during the reign of envelopes.

when you aren't using any application program at all, and—mirabile dictu—he also reviewed six low-cost dedicated envelope addressing programs.

About users' interest in envelope-addressing macros Mendelson isn't wrong we've received countless letters from readers requesting that we publish such a story Yet, one piece of evidence makes us worder whether a more subtle and poetic influence wasn't also at work, inspiring Mendelson to compose the function-kes sequences that belong to these macros. Is mere coincidence that, back in 1979, in his introduction to Auden's Selected Poems. Mendelson made note of a play Auden has coauthored with Christopher Isherwood entitled The Ascent of F6? We don't think so.

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All three BigBin models are available exclusively through Laser Connection™ dealers. For more information on how BigBin can maximize your paperhandling, call Laser Connection at **1-800-523-2696** for the dealer nearest you.

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Classified Intelligence: **Managing Personal** Information

Bill Howard/ Desktop disarray, schedule conflicts, priority confusion—the demons of disorganization are banished when one of these 25 personal information managers steps into your office to help you work more efficiently. Our reviewers look at the wide range of programs that make up this still-evolving genre of

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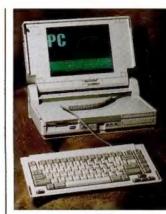
Printing the Perfect

Envelope

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Printing the Perfect Envelope Edward Mendelson/ Until now, the process of addressing and printing envelopes on an HP

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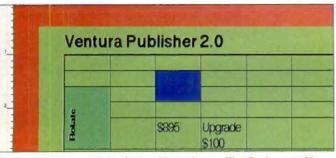


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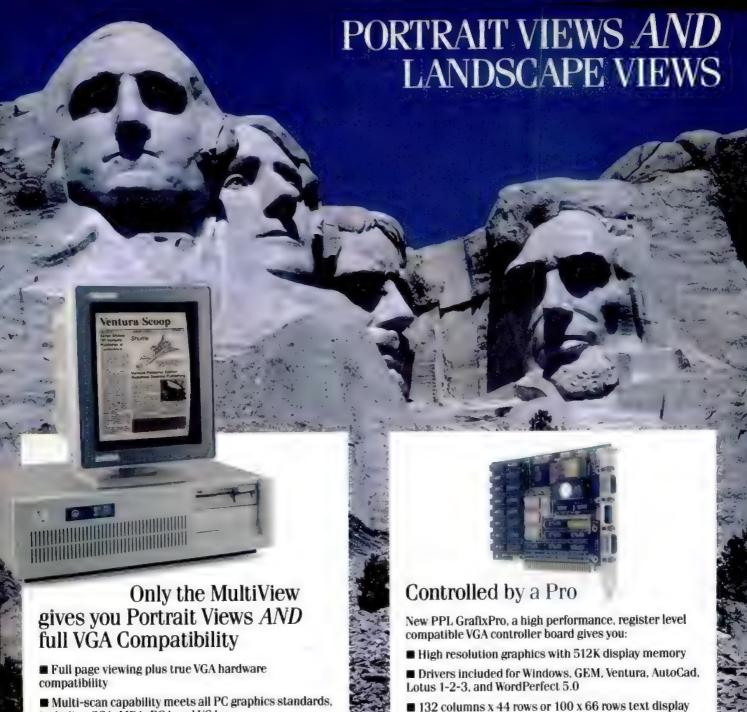
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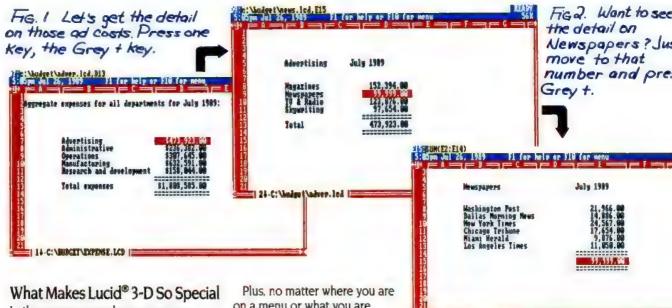
■ Support for MDA, CGA, EGA, and VGA monitors

combination, only Mount Rushmore comes close.

List price: Multiview Monitor

GrafixPro board

Any cell can contain a complete other spreadsheet that you can access with a single key.



In the screen examples you can see Lucid® is really three dimensional. Any cell of the spreadsheet can contain a complete other spreadsheet that you can access with a single keystroke. It is as simple as the pictures show. And you don't have to write formulas to do that.

All you do is go look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid® works that way. Users say "It is so intuitive that I really don't need a manual." That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid® in a recent article said that, "If there ever was an interface idea so good it ought to be stolen and widely used, this is it."

What he was talking about is a new menu approach that follows a simple design concept: it is easier to recognize than it is to remember. As choices are made on a menu that take you to lower levels you always can see exactly where you came from and where you are going. The complete menu path is always visible. You cannot get lost several levels down. This means you never have to remember a command, you just flow right to it.

Plus, no matter where you are on a menu or what you are doing, just press function key F1, and you will get a help screen specific to that command or action. Or if you want to know about any subject you can pop up an index of over 600 topics and select the one you want.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

Fig. 3 Here we are on level 3. There's no limit to the levels you can move down!

screen are completed. Other calculations you don't see continue on in the background during the next commands. The end result of this powerful combination is you rarely wait for a recalculation with Lucid®. You find out what instantaneous is all about.

6 1 I've been calling it an 'Everyman's Spreadsheet', and I think that's how the market will position it. It's much more than an inexpensive alternative to 1-2-3.

Jim Seymour, Columnist, PC Magazine, PC Week

Speed

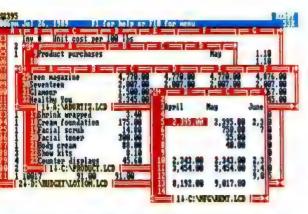
Lucid® 3-D™ is truly revolutionary. It is fast, fast, fast! It is incredibly quick in performing calculations because it doesn't recalculate every cell every time you insert an entry. Instead, it only recalculates the specific cells that are affected by your change. This is called minimal recalc. Lucid® also has a remarkable innovation called background recalc in which you are given control of the cursor the moment calculations affecting your viewing

Lucid® Learns

Lucid® 3-D™ also lets you teach it in any combinations of keystrokes so that involved sequences can be done with single keys. Plus more than just remembering keystrokes. Lucid® allows you to create Macros with loops, procedures and conditional branching amazingly all done automatically with simple menus. You can create your own menus that show the new features you have taught it. Another great feature is you can make your custom menus work like Lucid®

Return it within 60 days f you're not ecstatic!

ONLY \$99



ook! Lucid does multiple windows. Notice: different drives, directories, own many 3-D levels. All at the some time!

nere one choice can take you down a vel to a whole new set of choices.

That's nice is that they will work from the spreadsheet to another.

ouseability

ocid® 3-D™ was designed for both keyoard enthusiasts and mouse lovers ke. You can take your pick. Designed ound the mouse from the ground the interface is smooth and natural. ou select files to load from directory ts. Everything is point and click. What's ore, any Lucid® 3-D™ menu selection in be "moused" and the sponse time is "right now" instead of e sluggish "a little bit behind you" feel add-on mouse menu systems like cose you've seen with 1-2-3. A window pops up with a library of nction names you can page through th the mouse. Select, click and it's

the formula with no typing required.
The even have a label window that you in fill (from the keyboard) with favorite cels and names so that you can insert the mouse. There's even cop-up calculator to insert numbers so the don't have to go to the keyboard try often.

It really permits that feeling of

Treatly permits that feeling of ecoming one with your work. Lucid D™ has windows of user defined range times as well as the macros named by see user that can be selected just by Meno to: Bahert Smith

Enclosed are my estimates for the June 1980 Budget.
Please take a look at them, and see II they agree with your expenditures.

Expense Budget June 1988
Advertising 470,305
Advertising 244,507
Operations 244,507
Operations 245,332
Rannfacturing 144,602
Research 842,601
Total 1,994,907
Get hack to me as soon as pessible.
Thanks,
James Johnson

Here, we popped Lucid up over Word Perfect. Then we pumped those figures into a letter on-the-fly with the Clipboard. Click, click — that quick!

pointing and clicking. Icons that are easy to grab with the mouse let you resize and move the spreadsheet window with the ease you would expect. Plus you can go anywhere on the sheet by moving the mouse and clicking on the spreadsheet borders. And remember, Lucid® is designed so that any of those features are done with or without the mouse easily and quickly.

Audit

When you are staking a big decision on information gained from a spreadsheet you need to be certain that you have made no mistakes. Lucid® 3-D™ offers five audit displays and printouts.

Even if you don't plan to abandon 1-2-3. Lucid® makes sense. Files are

converted between them with ease so there's not an interoffice compatibility problem. This means you can have the power and fun of Lucid[®] 3-D[™] without having to upset your present systems.

We are excited about Lucid[®] 3-D[™]. But don't take our word for it, take us up on our 60 day offer.

Call us on our order line number and we will ship your order the very next day. This \$149 offer will end as soon as our dealer network is fully stocked. But in the mean time we invite you to try Lucid® as part of our "spread the news" campaign. Just pick up the phone and call us. We accept all major credit cards or you can order COD.



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Step 286/12	2.45 MIPS
Step 286/16	3.27 MIPS
Step 386/16	3.93 MIPS
Step 286/20	
Step 386/20	
Step 386/25	

Source: Power Meter MIPS Version 1.3. The Database Group, Inc.

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Janet Johnson, President Coordinated Digital Systems Dayton, Ohio





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The most incredible collection of people find their way to my door. Students.
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CompuStar: PS/2 and PC/AT Compatibility.

Ask any computer expert about what type of system you should buy maked as and you'll likely get a "reass the bus" response. Something like — "Well, uh, the PC/AT* bus is your best buy but, then again, the new PS/2* bus may become the next industry standard." Great advice, right? If trying to decide on a microprocessor weren't tough enough, now you're expected to pick a bus, too.

RELAX, NOW THERE'S COMPUSTAR'.

The all new CompuStar from Wells American not only lets you interchange microprocessors, you can also mix and match buses — a FC/AT bus, a PS/2 bus or. . .both. All your computing needs change, simply snap in a new processor or add an extra bus. You'll never again have to worry about buying the wrong computer system!



FOUR COMPLETE SYSTEMS IN ONE.

The CompuStar can be configured with any of four corporocessors — an 8086, an 80286, an 80386SX, or 80386. The processor and up to 16 megabytes of user mory have all been combined, using the latest VLSI technology, on a single, plug-in CPU module. Plus, any time tring the first year of ownership, CompuStar users can made-in the CPU module they initially selected toward the

purchase of any of the other more powerful modules. *Nobody* but Wells American gives you this kind of value.

A CONVERTIBLE BUS? YOU'RE KIDDING!

No, we're not. In fact, it may well be the most practical microcomputer innovation ever. Say you've selected an AT compatible CompuStar and later want to add PS/2 compatibility. No problem! Snap in a PS/2 Bus and Adapter Module and you can use both buses in the same system. Likewise, if you've selected a PS/2 compatible CompuStar and decide you want to add an AT bus, just snap in an AT Bus

Module. Depending on configuration, the CompuStar can have up to 13 bus expansion slots — all AT slots, all PS/2 slots or a "splitbus" of AT and PS/2 slots. No matter which bus becomes the

next industry "standard," you'll have peace of mind knowing y, ar investment in a CompuStar will be protected.

The CompuStar is also easily expanded. That's because there are seven CompuStar disk/tape compartments — six accessible from the front and an additional full-height bay inside. All this in a sleek, compact tower design that will leave more room on your desktop than any of the so-called "desktop" models.

A NEW IDEA FROM AN OLD COMPANY.

The CompuStar® Multi-Processor, Convertible Bus™ Microcomputer. It's no surprise that our engineers invented it. After all, we've been making microcomputers longer than anyone else. . .even longer than IBM! And if that kind of experience doesn't impress you, CompuStar's service programs surely will. You can select an optional overnight module swap-out plan or on-site service from General Electric Corporation — one of the most respected names in consumer electronics. And, of course, every CompuStar carries a full one-year factory warranty.

FINALLY, AFFORDABLE TECHNOLOGY.

Think all this technology sounds expensive? It's not. CompuStar 20MHz 80286 systems start as low as \$1995†. There are also inexpensive 8086 and powerhouse 25MHz

80386 systems available. Plus. there is a wide variety of CompuStar display, tape and disk options including a one gigabyte erasable optical disk. You can choose a factory preconfigured CompuStar or custom design one yourself. Just unlock the



front panel and literally "snap-in" a bus, CPU, memory or disk module in a matter of seconds. It's system flexibility never before available. . .at any price.

While one of our competitors (we won't mention any names) threatens you with "missing the bus," most simply pass the bus. Our new CompuStar, however, eliminates the bus problem altogether. Not to mention the processor problem. Even the expansion problem. Prove it to yourself. Call today about our 31-day trial offer. Oh, and by the way, the next time anyone asks, tell 'em you know where the bus stops.



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LETTERS TO PC MAGAZINE



SUPPORTING TOSHIBA

The review of the Toshiba T5100 did not mention the availability of 2 extra megabytes of 32-bit memory and Toshiba's superb user support ("Take It



or Leave It: Portables with Desktop Power," PC Magazine, October 11, 1988). Instead, the review consisted of an endless and hard-to-follow diatribe against the T5100's screen, which I find to be much more readable than an LCD screen.

The reader is also left with the impression that the T5100 does not take a coprocessor, nor does it have expanded or extended memory. This is plainly inaccurate. The T5100 on which I typed this letter has 2MB of expanded memory, 384K of extended memory, and an 80387 coprocessor in it!

Larry Greenhill Hammond, Indiana

IBM WISH LIST

I don't understand IBM. When the first PC came out, I was excited-wow, expansion slots! But now, years later, nothing really exciting besides speed has been added.

The new Tandy 1000 SL and TL computers have sound capabilities built into them; IBM's idea of enhancement is a zero-wait-state on an 80286-based system.

IBM needs to bring out a computer that is useful for business and home users and

doesn't require an upgrade every year. The dream computer should have a 25-MHz zero-wait-state 80386, with a Microsoft Windows-type operating system.

All I want is a useful, standardized computer that will last about as long as my car, since they are almost as expensive now!

Frank Loeffler Berkeley, California

COBOL: AFTER ALL THESE YEARS

In the view of many naive programmers and columnists, COBOL may seem an anachronism (Inside Track, PC Magazine, September 27, 1988), but it offers certain features that have yet to be replicated in any other language or system.

COBOL applications are inherently self-documenting and include useful logical and data structures. I have also found that maintaining a business application in COBOL is far easier than one written in BASIC, C, or even using a 4GL.

> Mark S. Crego Burke, Virginia

After 20 years of using COBOL, I find Mr. Dvorak's glib dismissal of it to be a slap in the face to me and the thousands of installations that continue to successfully use COBOL (Inside Track).

No computer language can legitimately claim to be a panacea, but COBOL continues to be an efficient tool in meeting the dynamic changing needs of business.

> John H. Fawcett Salt Lake City, Utah

COBOL may be short on glamour, but glamour is not something working programmers need (Inside Track).

COBOL may oblige you to say ADD when you add something or MOVE when you want to move something, " Shakespeare's English.

COBOL may have a blue-co but for consultant's fees of \$60 ··· up, I'll wear a blue collar. C'. ' not be sexy, but neither was my Nova, and it was the best car I'. John Derb New York

COBOL is, indeed, a rugged Nova kind of programming last: snide comment was uncalled for up for it, I will make the popul . COBOL on microcomputer work. After that is accomplished to popularize RPG II on a micready working on a spreadsha. written entirely in COBOL.

ANTIQUE COMPUTING

—John C. Dvorak

My Ph.D. brother-in-law a grammer son both sneer at my with two 51/4-inch floppy ("Feelings of Inadequacy. Tool," PC Magazine, Sep-1988).

I own an antiques shop, and tant tools are my 11/2-ton van a puter, which has become e -bookkeeping, Slow? Sure, it t. ! onds to recalculate my profit month. But it takes longer that my van out of the driveway and I do that several times a da

> John F Stanto

RESPECT FOR THE ELDE!

PC Magazine has become far with the "latest and greatest" ly ignoring those who must co. andoes

image. lay and L may Chevy rr bad.

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> 17 pro-· clone

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daware

SCSSCAL - large c to get



BUSINESS

2 13 - (2 disks) Prepare spreadsheets w/powerful Express Calc. 53 - Create, fill in & print yr business forms w/EZForms. 512K 79 - Generate statements, ease record keeping withe invoicer. I 117 - Handle your personalitiz money picture wiFinance Mgr IU 12 136 - (2 disks) Track inventory, sales, wPC-Acct booking mgr. I 12 159 - (2 disks) Mass Appeal mail mgr for envelopes, labels, etc.) 1 190 - Make accurate job, cost estimates w/PDS*Quote. 640K. □ 201 - Log bank transactions, produce financ'l reports w/Checks. 2 226 - (2 disks) File Express menu driven all purp database mgn 2 232 - (2 dishs) Friendly Dr. Data mail mgr is easy-to-use. 640K 234 - Control & update inventory w/T-Master; know daily levels 267 - Add special chars, line graphics to yr word processr w/Ot 316 - Manage clients, sales prospects w/Trackrt 512K, hrd dek. 2 319 - (2 disks) Keep appointmnts, update agendas w/Ez/Desk. ☐ 337 - Analyze your credit charges, payrmits, interest wiChargel
☐ 383 - Track yr portfolio, get weekly reports wiMutual Fund Myr.

EDUCATION

1 186 - It's painters learning DOS withe interactive DOS Tutor. I ☐ 191 - Learn music, US states w/PC-quizzer. Sign lang demo! I 228 - Build dazzling typing speed practicing wPC-Fastype. ★ I ☐ 297 - Graphic mathematical puzzle game makes learning fun! ☐ 366 - It's simple to leep, average student grades wGradescand 376 - Teachers & students can summerize grades w/GradeM. 2 384 - (2 disks) XY-See graphic math for HS & college students.

GRAPHICS 58 - Display hi-res 3-D molecular structures w/Chemvw. EGA. 2 145 - (2 disks) Paint, draw wifingerpaint, design w/Altamira. 2 210 - (2 disks) Create advanced 3D designs! 640K, hid dsk. 4 3 285 - (3 dieks) Produce grt 3-D images w/Surlmod graphics. * 2 362 - (2 diels) Edit graphics, colorize pics wVGACad! VGA.

GAMES 15 - Biblemen game tests knowledge of Bible figures/events. I 23 - Star Trek, Othelio2 board game, artillery bombing. EGA. 28 - Play Backgammon, or Wordplay (like wheel of fortune)! 84 - Three solitaire card games, Spider, Klondiks, Carrield! +1 121 - Qubert, Pango, Centipede, Hopper (lk Frogger), more! *

| 151 - Hack puts you & trusty dog in a wild adventre (ft Rogue). | 176 - Destroy enemies wiStriter, conquer the world in Flick. * ☐ 215 - Solve, create own word puzzles with Phrase Craze! ☐ 289 - 3-D Pacman, Kong, Spacewar, ABM (missile omd), ★ 309 - Blackjack (you set rules), ArmchairOB, imperial war!

321 - Star Trek, the origin't Colossal Caves Adventure, more. 5 365 - (5 disks) Create your own grt adventure games. 384K. 372 - Pinhall, Othello, Dragons, Sopwith (fly one), bettleship. * UTILITIES

138 - Packed wibrint utils for print spooling, banners, fonts, etc. 1 141 - Print wide documts/spreadsheets sideways w/On-Side [2] 214 - (2 disks) Search for addresses w/Zio-Phone cross ref. 1 258 - Work around DOS w/Easy Access hard disk menu sys. ☐ 275 - Acollection of invaluable general purpose DOS utilities.

MESCELLANEOUS

31 - Movie Database fists 4,000+ films availa 48 - (4 disks) Access 6000+ famous quotes from world history 74 - Trouble w/your landlord? Learn your legal tenant rights!

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* Diales so marked above require a color graphics adapter.

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LETTERS

by with older, but still perfectly functional, technology. Bill Howard's response to Pat Nims (Letters, PC Magazine, September 27, 1988), who felt that you are placing too much emphasis on state-of-the-art equipment, was out of touch with reality. Could this be an indication that PC Magazine is losing touch with reality?

> Joel Klutch Castro Valley, California

Using a computer is akin to using drugs: the more power and speed you have, the more you want. Many of us, however, cannot afford nor do we need the latest 25-MHz 386 machines.

While the 286 machines are becoming fairly common, there is a very large installed base of the 8088 machines. This market is one from which you are drifting away. Don't retreat from the "new" stuff. but please don't forget us "on-the-cheap"

> Leland W. Olmsted Olathe, Kansas

SCIENTISTS NEED GRAPHS, TOO

More attention needs to be paid to the scientific community. None of your discussion or tables on graphics programs



("More than Meets the Eye: Designing Great Graphics," PC Magazine, September 27, 1988) mentioned logarithmic scaling capabilities or compatibility with scientific format numbers.

Remember, PC Magazine is valuable to others beyond the business community.

> Les Slaback Gaithersburg, Maryland

APPROPRIATE INTERRUPTION

The Bernoulli Box II review ("Removable Mass Storage: You Can Take It with You," PC Magazine, September 13, 1988) states that "the box does not respond to interrupt 25h calls" and "since the BIOS Disk Seek test relies on the interrupt 25h call, we were unable to obtain re-

sults for the Bernoulli.'

Interrupt 25h is a DOS interrupt and the BIOS disk interrupt is 13h. My Bernoulli Box 10+10 has no difficulty being accessed by DOS interrupt 25h



but can cause problems if accessed by BIOS interrupt 13h. Your description in the graph and tables in the article appear to give the correct description.

> N. Gray Edmonton, Alberta Canada

■ The face of consumer products has changed since Henry Ford said "You can have a Model T in any color, as long as it's black."

SELLING BY NUMBERS

John C. Dvorak attributes the use of nume bers and letters to name foreign cars to some "nonexistent-merchandising the ory" ("Selling Sizzle with the Steak," PO Magazine, September 13, 1988). It's not as simple as that. There are some name: that work internationally (for example: Rambo, McDonald's), but numbers are all together safer and simpler to use across cultural barriers. Translations into certain languages can change the entire meaning of the original name.

I do, however, agree with him about color!

Nick Miller London, England

The face of most consumer products has changed since Henry Ford said, "You can have a Model T in any color, as long as it':



Get VGA graphics resolution on any EGA with autosync monitor for AutoCAD, Windows and Ventura Publisher.



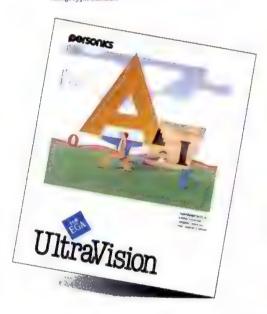
Change fonts, colors and screen sizes in popular word processors like WordStar & Word Perfect, 80 × 60 shown.



See more rows and columns in 1-2-3 or Symphony. Build a 12-month forecast without scrolling left and right.



Give DOS a new look. You can even color code directory listings by file extension





See more on the screen when you write code or review program listings in editors like Brief. 120 × 43 shown



Enhance was and additetes to any dBASE data entry form, 80 × 43 shown



Use color and compression to enhance Fastback Plus Run terminal emilators like VTERM with 132 columns.

Supercharge your EGA

Introducing UltraVision™ software that turns your EGA into a state-of-the-art display. You get more bells and whistles than the latest video cards, without replacing your current hardware.

Goodbye, drab colors.

Was your favorite application designed by a color-blind programmer? No problem. We've unlocked the full 64-color EGA palette so you can change screen colors to make *any* application look just the way you like.

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UltraVision comes with a special Booster Card that plugs into the feature connector on your EGA. Now you can see more and scroll less in a host of popular applications. Choose screen dimensions up to 132×43 .

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UltraVision is from the makers of SeeMORE. SmartNotes Look & Link. and BASE. UltraVision for VGA and plasma displays coming soon.

; !	UltraVision
	Please send me:

_____copies of UltraVision at \$119.95 each. Include \$3.75 shipping per order. (\$12 outside USA and Canada). Mass. residents add 5% sales tax.

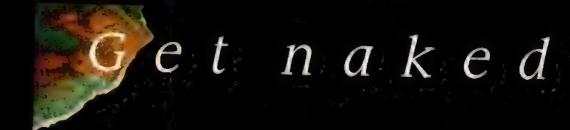
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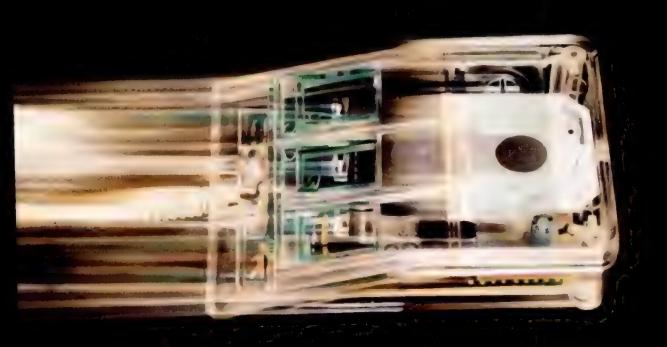
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To celebrate the shipment of our two millionth mouse, we took the covers off our winning technology.

But this mouse is a lot more than just a pretty case. It's compatible with virtually all mouse-based programs, plus you can program it to "mousify" any keyboard-based application. And it doesn't need resetting when you switch programs.

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like PaintShow which, it so happens, comes with your ClearCase Mouse

You get everything for \$149. The package includes: the Logitech ClearCase Mouse for IBM PC, XT, or AT and PS/2 or 100% compatibles; a 9-25 pin adapter; Plus Package™ software; and Logitech PaintShow™ (which requires a graphics card).

Pick up the ClearCase Mouse at your computer dealer, or call: 800-231-7717.
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LETTERS

black" ("Selling Sizzle with the Steak"). If it were up to the PC clone makers, however, we'd all be driving around in beige Chevys.

> Jonathan Angel Palo Alto, California

 The computer will never replace a good executive secretary for keeping information organized.

CONNECTING OVER THE PHONE

I thought that since the days of Don Ameche, fast performance over a telephone wire was what occurred at approximately 7 P.M. on Saturday night when you had to arrange a date for your girlfriend's cousin who just arrived from out of town ("Making Connections: Fast Performance over Telephone Wire," PC Magazine, September 13, 1988).

> John Gillis Williamsburg, Virginia

PUTTING THE PC IN ITS PLACE

One reason PCs may not be used much in the strata Bill Machrone discusses is their physical characteristics ("Getting CEOs to Use PCs," PC Magazine, September 13, 1988). They are large, unattractive, and have noisy fans in their power supplies.

The monitor is big and its color is that of equipment rather than furniture or an office accessory. It generally has wires coming out of the back, which makes it look unfinished.

A more appropriate monitor would be as attractively styled as function permits, with cables that exit through the bottom of a pedestal so they could be hidden through a grommet in the desktop.

> James J. Ryan Cincinnati, Ohio

As president and CEO of a corporation, I must agree with Bill Machrone that the computer is of very little use in running a | Magazine and are subject to editing.

company ("Getting CEOs to Use PCs").

It is much faster to keep information in my head for instant recall than trying to find it in a computer. The computer will never replace a good executive secretary, who is even better than I am at keeping information organized.

How do we keep all this information in our heads? I don't know-maybe that's what makes us CEOs and executive secretaries.

> Jack Malone Uvalde, Texas

PORTABLE CHAUVINISM

On the cover of your March 29, 1988, is-

sue, you show three men holding portable computers with the blurb "Power to Go." I notice there are no women, and no person (arm) of color. Don't you agree that it's time to stop seeing men



as the only symbols of power in our culture?

> Suzanne Simon Hadley, Massachusetts

Well, yes and no. If you look closely at the arm bearing the gold bracelet, you'll see that it is, in fact, a woman's. Symbols of power are relative.-Ed.

CORRECTIONS/AMPLIFICATIONS

The new prices for the IBM Proprinter III and the Proprinter III XL ("Dot Matrix Printers: The Market Matures," PC Magazine, October 31, 1988) are \$699 and \$925, respectively.

The correct telephone number for Bob Mahoney's Exec PC bulletin board is (414) 964-5160 (PC Advisor, PC Magazine. October 11, 1988).

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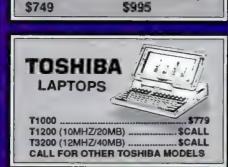
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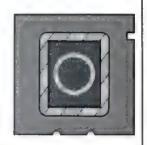
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■ JOE DESPOSITO

PC ADVISOR



Advice on peeking at program code, how to abolish cryptic DOS filenames, and help in finding the right package to solve statistics problems.

PEEKING AT CODE

Is there a better way than using DOS's DE-BUG to peek at program code? As a programmer, I like to see how the programs I use work, but DEBUG leaves me in a state of frustration time and time again.

Tara Sanders Boston, Massachusetts

Sourcer (\$99.95; V Communications, 3031 Tisch Way, #200, San Jose, CA 95128; (408) 296-4224) is rapidly earning the status of a program no programmer should be without. Sourcer does an intelligent job of disassembling .COM, .EXE, and other binary files, and it goes a step further by actually documenting the program listings. V Communications is even offering a 30-day, money-back guarantee for those who think it sounds too good to be true.

THE LONG AND WINDING TRAIL

In your column of September 27, 1988, you mentioned two solutions for providing audit trails on a PC. I think our company provides a more elegant solution than the ones you mentioned. It's called the PC/Audit Card.

It is an add-on card for PCs, XTs, ATs, and compatibles that is designed to track the use of the machine and keep the resulting audit trail in the secure environment of the card's memory.

It also gives the extra features of password-protecting the machine, tracking computer usage, and limiting features according to the security level of the current user. The card contains its own nickel-cadmium battery and memory for the auto trail. For extra security, special screws can be purchased for securing the card in the machine and securing the machine cover.

The flexibility of tracking only the information needed, such as user, programs accessed, and access time, makes this, I think, a considerably more elegant solution than the ones offered.

Ken Dobson Essex, Massachusetts

Thanks for the information. PC/Audit Card is available from Northedge Software (239 Western Ave., Essex, MA 01929; (508) 768-7660). Its list price is \$299.95.

BREAKING FILENAME BARRIERS

I use WordPerfect for word processing and Symphony for spreadsheet analysis. Unfortunately, these programs, like most, restrict filenames to eight characters plus a

■ There are several programs on the market that will let you break the eight-plus-three-character filename barrier imposed by DOS.

three-character extension. This makes it very difficult to keep track of numerous files that may be related. Are there any software programs that will let me use more than 11 characters to name a file?

Marc S. Tenan Harrisburg, Pennsylvania

There are several programs on the market that will let you break the filename barriers imposed by DOS. One that I recommend is Retreeve from SDI (Software Directions Inc., 1572 Sussex Tpke., Randolph, NJ 07869; (201) 584-8466). It allows you to use as many as 64 characters to describe each file.

Retreeve is a RAM-resident program that also helps you organize your hard disk. You can create your own menu system with a hierarchy that is independent of the DOS directory. Disks can be organized like file cabinets that hold file folders, contain manila folders, or hold a group of documents. Although you structure your own filing system, word processing and other programs can be accessed as always, and programs will still "see" your files in normal DOS directories. The list price of the program is \$99.

Another good one is Extend-A-Name (World Software, 124 Prospect St., Ridgewood, NJ 07450; (201) 444-3228), which allows you to name files with names of up to 60-characters long. It also lets you organize files into libraries that replace subdirectories. Extend-A-Name is RAM-resident and pops up when it detects an application's load or retrieve prompt. The list price of the program is \$79.95.

■ PC ADVISOR

STATISTICALLY SPEAKING

I am a research scientist interested in obtaining software that performs statistical analysis of data of both parametric (regression analysis, for example) and nonparametric (chi square, student t, and spearman rank correlation) forms.

I'm also interested in performing surface plotting of my data and other modeling functions. What software package(s) can you recommend for these tasks, and what review articles can you suggest for my basic enlightenment on this subject?

> F. Louis Floyd Strongsville, Ohio

There are several statistical programs on the market capable of performing the functions you need. One that I recommend is Systat (Systat Inc., 1800 Sherman Ave., Evanston, IL 60201; (312) 864-5670). Systat is a comprehensive statistical, graphics, and data management package

that provides a full range of univariate and multivariate statistical analyses. The latest version, 4.0, has enhanced data handling and statistical capabilities and adds the Sysgraph graphics module, a macro facility, data file import/export routines, and text editing capabilities. The list price of Systat is \$795.

If you want to "try before you buy," a personal version of Systat, called Mystat, is available free from the company. To get it, you must send a request to Systat on company or university letterhead (college students should include a copy of their IDs). Included with the disk is a free booklet, called Statistics Quiz, on how to tell if a statistics program is accurate.

Another good statistics product—one used by our PC MagNet staff—is SPSS/PC+ (SPSS, 444 N. Michigan Ave., Chicago, IL 60611; (312) 329-3300). Suggested retail price of the base product is \$795, with graphics \$395 more.

A comprehensive roundup of statistical programs will appear in a forthcoming issue of PC Magazine,

A program that specializes in 3-D surface and contour plotting is SDS (Datanalysis, P.O. Box 2364, Kirkland, WA 98083; (206) 522-1348). SDS lets you plot any scientific data that consists of a set of x,y coordinate pairs with associated z values, including topographic, geological, environmental, and medical data. The list price of SDS is \$995.

Note: Computer Foundations, mentioned in the September 27, 1988, column, was listed with an incorrect ZIP code. The correct ZIP code is 14618.

ASK THE ADVISOR

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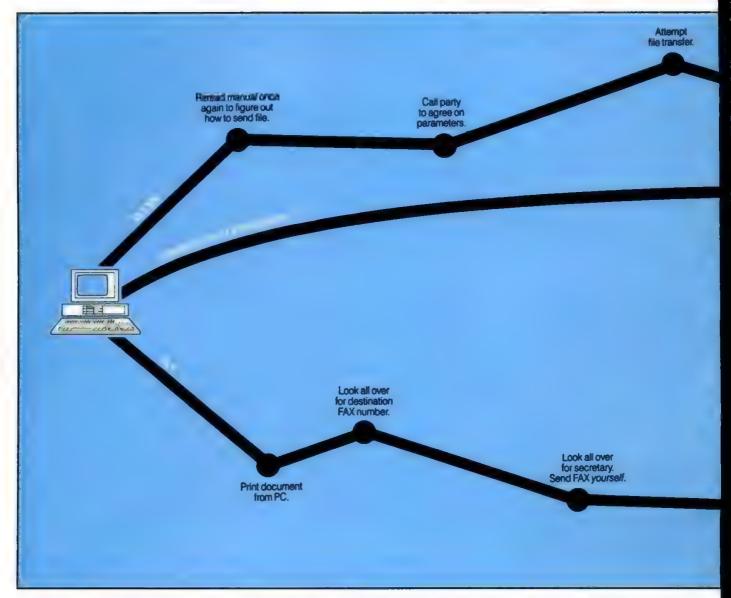
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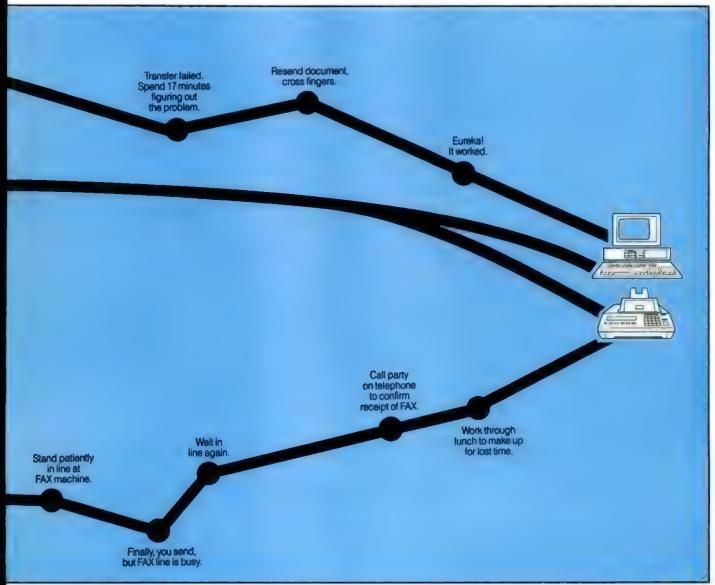
And when you fax, there are no more stopovers at the printer, or cooling your heels in line at the fax machine. Because Connection lets you do everything without leaving your PC.

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FIRST LOOKS

Ventura Publisher 2.0 Adds Spot Color, Multiple Format Text Merge



HANDS ON-

BY TAMID, PETERSON

With over 70 new features, Xerox's Ventura Publisher, Version 2.0, leaves little need for improvement. That's fortunate, because this program is now so full-featured that the interface is an option away from being stressed.

In order to squeeze in all the new features, the Ventura Publisher programmers have created a slightly new menu convention. The program still employs the drop-down main-menu system native to the GEM environment, but menus and dialog boxes are now supplemented with what might be described as pop-within menus. A double-ended arrow icon to the right of



Context-sensitive Help is available within Ventura Publisher 2.0 by selecting the new question mark icon that is found in each dialog box.

an option indicates the availability of some further, related options. These mouse-activated side menus deliver everything from simple on/off toggles to multioption hierarchical sets of dialog boxes.

Ventura Publisher veterans will have no trouble exploring the new options and will delight in the discoveries made. New users, however, may find the seemingly endless array of options to be a maze better suited to a live mouse.

Ventura Does Windows

Two enhancements have been made to satisfy the needs of Microsoft Windows users. Pulldown main menus can now be opted over the drop-down style. A .PIF file is also included so users can run Ventura Publisher through their Windows program. This worked well during our tests and even prevented the system from freezing when going between the two environ-

(continues on page 34)

Intel Connection CoProcessor Introduces Powerful New Standard



HANDS ON

BY M. KEITH THOMPSON

Sending data over telephone lines takes a lot of time and processor power. You're better off if you can do something else while your computer is moving data, but running communications programs in background mode really slows down foreground processing. This situation begs for a separate coprocessor to run the communications functions, and that is what the Intel Connection

CoProcessor is all about.

The Connection CoProcessor is several products in one. It is an internal 9,600-bit-per-second data and fax modem with options for 2,400-bps V.22 bis operation. It is a bundled product with single-user software for fax and electronic mail operation. But perhaps most important, considering the pricing of the product, it is a fast data and fax communications gateway that many people can share on a LAN. This product is ideal for LAN-to-LAN e-mail and filetransfer systems.

The importance of the Connection CoProcessor in the communications marketplace is sure to increase, because Intel joined with Digital Communications Associates to create a public-domain standard for PC communications known as DCA/Intel Communicating Applications Specification (DI-CAS). Applications written to this standard will be able to communicate quickly between PCs with little or no disruption of other processes.

Using its 10-MHz 80188 mi-

(continues on page 35)

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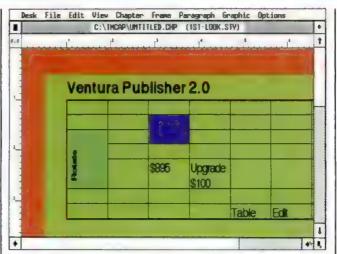
Ventura

(continued from page 33)

ments, an irritation you grow to expect when you use them independently. We didn't perform this test with extremely large documents, however, so be sure to save your document often when trying this yourself.

The on-line help should prove to be among the more useful new features in Version 2.0. Most dialog boxes now include a small question mark icon. When selected, the icon displays another menu with help options related to the current action. There are 250 such learning messages throughout the program. With so many new features to master, even Ventura Publisher veterans will appreciate this addition.

Many new Ventura Publisher built-ins will eliminate the need to purchase certain thirdparty products made to enhance past versions. For instance, Version 2.0 now includes its own utility to print the composi-



Professional Extension imports Lotus .PRN file data directly into a tabular grid, each cell of which can be individually formatted with colors or shading.

Word, MultiMate, WordPerfect, and WordStar.

To further reduce outside production setup charges, spot color printing has also been added. Ventura Publisher can print a separate page for each of six defined colors in your layout. You can choose your colors from a palette of over 62 milwith Ventura Publisher, so it operates as a completely integrated product. The only visible difference is a fifth mode seen just below the four original modes: Frame, Paragraph, Text, and Graphics.

This fifth mode, Table Edit, is Ventura Publisher's answer to on-screen forms design. Rectangular grids that act as individual frames are easily structured to display numeric tables, side-by-side paragraphs, or any custom-designed form. This mode is especially useful to spreadsheet users. A Lotus .PRN file import option will place spreadsheet data directly into a tabular grid, each cell of which can be individually formatted. This includes background color and shading as well as rotated text (now available in 90, 180, and 270 degrees).

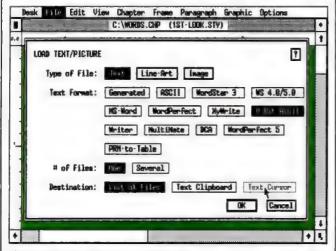
Professional Extension also includes EMS support, allowing the creation of extremely large documents (up to 32MB) and much faster operation.

The other outstanding feature of the Professional Extension is the dynamic WYSIWYG equation generator. Complex mathematical equations can by typed anywhere in the text by using simple commands such as sqrt (x sup 2 + y sup 2). The results are immediately displayed from a complete set of equation fonts included for all supported printers and displays.

For \$1,295, you can opt for the new network version of Venrectly supported are 3Com, Novell, and PC Net, and other networks can be adapted. Most standard network options are included, as well as special features like an alert that notifies a user when a file within a chapter has been modified by someone else on the network. Read-only files include Style Sheets.

Network pricing mandates that each concurrent user own a full-price copy of the product. The Professional Extension can be added to the local area network for \$595, also per concur-

Of all the new features that Version 2.0 offers, you will probably be most impressed by the few that directly affect your particular business. This new version offers features to better satisfy the needs of designers, typesetters, magazine and book publishers, foreign language users, scientists, engineers, MIS managers, and even financial users. There is certain to be at least one new feature to give evегу Ventura Publisher 1.1 user a reason to upgrade. And there are a multitude of reasons for every desktop publisher to take a good look at this excellent product.



The Merge Text feature allows you to combine various word processing text files of different formats into a single Ventura Publisher file.

tion elements of a Style Sheet. This elaborate and detailed document summarizes all Frame, Color, Tag, and Tab settings.

Another especially pleasing addition, the Merge Text feature, combines word processing text files of different formats into a single Ventura Publisher file. You can also convert the combined file back into a word processor format for use outside of Ventura Publisher. Supported formats include Microsoft

lion, but you want to stick to the primary and secondary colors unless you have a color printer. (Spot color printing is different from printing four-color separations, which is still a rare commodity in the desktop publishing world.)

A Professional Addition

For an additional \$595, Version 2.0 users can purchase the new Professional Extension. This high-end module is installed | tura Publisher. Networks di-

FACT FILE

Ventura Publisher, Version 2.0, Professional Extension Xerox Corp.

Systems Unit 9745 Business Park Ave. San Diego, CA 92131

List Price: Ventura Publisher 2.0, \$895; upgrade, \$100 (free for users who purchased after Aug. 15, 1988). Professional Extension, \$595.

Ventura Publisher-Desktop

Requires: 640K RAM, 1MB to 3MB disk space, IBM PC-XT (mouse highly recommended), DOS 2.0 or later.

In Short: This latest upgrade makes Ventura Publisher suitable for anyone in need of high-quality, professional documents.

CIRCLE 448 ON READER SERVICE CARD

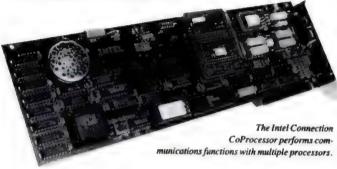
intel

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croprocessor and 256K RAM. this full-length coprocessing board communicates with other PCs similarly equipped and with all Group III fax machines. Among themselves, CoProcessor-equipped PCs can exchange files or faxes at 9,600 bps. Co-Processor-to-CoProcessor file transfers are fast and error-free. Working with fax machines, you can send faxes in standard (200- by 100-dot-per-inch) or fine (200- by 200-dpi) resolution (standard allows for shorter the familiar light-bar-style menus and is used to schedule and log file and fax exchanges. There is a phone book module as well as a log to keep track of who sent what to whom and how it was sent. The log also records unsuccessful communication attempts.

You'll also find an Intel-specific version of PC Paintbrush. This version has very few modifications from the original and may be used to create and modify fax/graphics files.

The software falls short



transmission time). With its optional 2,400-bps V.22 bis Hayes-compatible modem adapter, users can also communicate with all other compatible

The speed of file transfers between CoProcessor-equipped machines is much faster than transfers between computers equipped with 2,400-bps modems. How much faster depends on the quality of the telephone line and the software you use with the traditional modem. However, since the activity is all in background mode, the major advantage of the speed is reduced connection costs.

The CoProcessor board also has a round connector on the back panel, the same connector used by Apple's LocalTalk cabling scheme. Intel's tech support folks say that the connector is "not functional at this time." Obviously, someone is thinking ahead to making LocalTalk connections to Apple laser printers and other devices.

At \$995, the coprocessor comes complete with software necessary to manage CoProcessor and fax transmissions and to create and modify graphics files. The connect program has

when it comes to giving users calling choices. For instance, office users often need to choose between long distance outside the area code, long distance within the area code. PBX-dependent lines, single lines, or credit card calls. The CoProcessor software gives you little flexibility in making these decisions.

However, other positive features of the software stand out. Convenient power user modes address repetitive tasks such as sending multiple files or creating distribution lists. The software reviews each name on the delivery list and sends information the appropriate way (Co-Processor or fax).

As you would expect, the software takes advantage of EMS memory, if available. This proves very important to memory-conscious users; the code allowing background and unattended operation requires

There is good and bad news about the add-on modem feature. The good news is that the add-on modem provides reasonably priced (\$295) 2,400-bps Hayes-compatible V.22 bis capability. This modem will work with any standard communications program. The bad news is that the processor doesn't control the modem. Using the modem on the CoProcessor board takes as much processing power from the PC as using any other modem.

Installation of the CoProcessor is simple for both novices and experts. If you are wary of having an installation program rearrange your CONFIG.SYS and AUTOEXEC.BAT files, you have nothing to fear here. The software installation program allows the options of altering the batch files or not. It also allows the user to define the disk drive and subdirectory used for program and associated data files. The setup program gives the user such custom options as distinguishing the default fax cover page from primary text and specifying custom colors. Several I/O addresses are available, as well as two DMA (Direct Memory Access) channels (1 or 3).

There are less-capable but adequate fax cards that cost much less than the Intel Connection CoProcessor. But the real advantage of this type of product is seen when the Co-Processor is shared in the workgroup environment. Intel is building a cadre of companies that support the CoProcessor. Two products, LAN/FAX 10 from Alcom and Higgins To: FAX from Conetic Systems, allow all stations on a LAN to



Intel Connection CoProcessor

Intel Corp.

Personal Computer Enhancement Operation 5200 NE Elam Young Pkwy. Hillsboro, OR 97124 (503) 629-7402

List Price: \$995; optional 2,400-bps Hayes-compatible modem, \$295

Requires: 480K RAM; IBM PC, XT, AT, or compatible; hard disk; graphics display (mouse recommended); DOS 3.0 or later.

In Short: Combined fax and communications using multiple processors to enhance micro performance. Utilizes the newly announced DCA/Intel **Communicating Applications** Specification.

CIRCLE 449 ON READER SERVICE CARD

share the Connection CoProcessor. Each user can send and receive e-mail, data files, or fax images through the CoProcessor gateway.

The combined backing of Intel and DCA seems to guarantee that the Intel Connection Co-Processor will get the attention of the industry. This should foster products that include the value of communications without the overhead.

DCA/Intel CAS Promises No-Sweat Fax

The DCA/Intel Communicating **Applications Specification** (CAS) is designed to make communicating easier for you. The specification describes how application programs can send data to the Intel Connection Co-Processor and other DCA/Intel communications devices for automatic transmission. If authors of programs as diverse as word processors and CAD packages follow this specification, their programs will be able to send data through a communications port as easily as they now send data to a printer.

A CAS software component

called the Resident Scheduler receives data from an application and uses its stored information to route the data out the best way. In this release, CAS only knows about the communications alternatives on the Connection CoProcessor, Later releases will use IRMA mainframe links as a transmission option.

DCA and Intel promise CAS interfaces designed in add-ins and future releases of popular packages including Lotus 1-2-3, SideKick Plus, WordPerfect, and Q&A.

-Frank J. Derfler, Jr.

HP LaserJet IID Prints on Both Sides Of the Page, Rotates Portrait Fonts



HANDS ON

BY EDWARD MENDELSON

Print a page with the Hewlett-Packard LaserJet IID and you'll have something to look at when you turn the page over. Hewlett-Packard's new \$4,295 laser printer automatically prints on both sides of the paper. No other desktop laser printer can perform this feat, nor can any other printer priced as low as the HP LaserJet IID.

Hewlett-Packard is shipping the LaserJet IID now, and you don't have to wait for the next

from the second paper tray, and the envelope from the automatic envelope feeder. A task that used to call for awkward papershuffling can now be performed entirely from the keyboard.

The HP LaserJet IID is an evolutionary upgrade from the Series II, still available at \$2,595. At the heart of both printers is the proven Canon SX engine, with its clean, dark 300dot-per-inch output, operating at the same rated speed of 8 pages per minute. The HP LaserJet IID looks like a Series II that hatched a clone of itself and is now sitting above it. The gen-



In addition to duplex printing, the HP LaserJet IID sports two 200-page paper trays and an optional envelope feeder (not shown).

version of your word processor to put the duplex printing to the test. Just plug in the printer, press the front-panel buttons to turn on duplex printing, load any software that works with the earlier Series II, and start printing on half as much paper as you needed before.

The HP LaserJet IID comes with two 200-sheet paper trays and can be fitted with an optional \$350 envelope feeder. A few simple software commands let you print the first sheet of a letter on both sides of your letterhead, the remaining sheets on both sides of blank pages taken and connectors is the same, but the body of the printer has doubled in height, and its weight has increased from 50 to 74

Because the Canon engine can't print both sides of the page simultaneously, the HP Laser-Jet IID uses a scheme that seems to have been designed by Rube Goldberg. After printing the top side of the sheet, the printer ejects the page into the rear paper tray, then pulls it back through a special paper path to print the bottom side. The page is finally ejected into the top paper tray, where it rests facedown in the correct order. It looks a lot less improbable than it sounds, and it works reliably with any standard paper up to a weight of 24 pounds. The whole process adds less than 10 percent to the time needed to print a

You can tell the HP LaserJet IID to print a file so that the duplex pages are arranged for binding on the long or the short edge, and for calendar- or bookstyle reading. You can choose these options from the front panel, but printer drivers now in development will soon make duplex printing options available from within all major word processors. A new WordPerfect 5.0 printer driver is ready now, and drivers for other programs will follow quickly.

The optional envelope feeder holds 50 envelopes, sits on top of the upper paper tray, and takes electrical power from a small plug at the side of the printer. If you don't need this \$350 option, you can still feed envelopes manually or use the same \$85 envelope tray (capacity 15) available for the Series II. But the new feeder is more reliable than the old tray and will pay for itself in convenience alone.

Compared with the HP LaserJet Series II, the IID adds a little bit of everything. In addition to the internal 10-pitch Courier, Courier Bold, and Line Printer fonts in the Series II, the HD adds Courier Italic and 12pitch Courier fonts in normal. italic, and bold. The printer also comes with HP's S2 font cartridge, with 8- and 12-point Times Roman and 14-point Helvetica. All soft fonts and font cartridges that work with earlier LaserJets can work with the

The HP LaserJet IID automatically rotates any portraitorientation font into a landscape font, whether the original font is from a cartridge or soft font package. This means you can clear all your landscape soft fonts from your hard disk, and



FACT FILE

HP LaserJet IID

Hewlett-Packard Co. Contact your local Hewlett-Packard dealer.

List Price: \$4,295; optional envelope feeder, \$350.

In Short: A fast, high-quality laser printer with duplex printing, two paper trays, and optional envelope feeder.

CIRCLE 450 ON READER SERVICE CARD

you won't need to buy any landscape cartridges. The one slight disadvantage of this scheme is that the printer uses extra memory for the rotated version of a font and has no way of telling your applications that you've used that extra memory. The result may be an "Out of memory" error message, which you can cure by downloading fewer fonts or buying an add-on memory board with 1MB to 4MB of extra RAM. The HP LaserJet IID comes equipped with 640K RAM—up from the 512K allotment in the Series II-but the extra memory is used internally by the printer, so the same 395K available to the user in the Series II is available in the IID for either downloaded or rotated

Although the HP LaserJet IID includes a slot for an alternate I/O interface, it won't accept the video interface that was used to attach add-on PostScript boards to the Series II. None of the PostScript boards designed for the Series II, such as the QMS JetScript, will work with the IID. You can count on thirdparty vendors to fill this gap with new products. And a recent announcement that Hewlett-Packard has licensed PostScript from Adobe for hardware addons suggests strongly that HP will supply a PostScript adapter of its own before long.

Until now, the LaserJet Series II has been the printer of choice for fast, sharp, quiet, reliable printing with almost universal software support. The HP LaserJet IID provides all these features-in duplex.



Daniel Wm. Fessler
Professor of Law

as much as Glyphix users like our product, most of them don't take the time to write us letters. Professor Fessler did. He bought our WordPerfect

WordPerfect 5.0 A True Story.

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1.1, Wordstar 2000 (3.0), Wordstar Professional 5.0, PC Write, PFS First Publisher 2.0, Lotus Manuscript 2.0 and more. And each font comes in 6 to 60 pt.*, portrait and landscape; italic, bold and bold italic.

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☐ San Serif	\$99.95		
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'Glyphix lets you print up to 30 point type on a LaserJet Plus and up to 60 pt. on a Series II without additional memory. Glyphix fonts require an IBM PC, AT, XT, PS/2 or compatible with 64K RAM; a hard drive, LaserJet Plus, Series II or compatible printer, MS-DOS 2.0 or later. Glyphix Font Managers are available for Microsoft Word and Word Perfect 4.1, 4.2 & 5.0. Glyphix fonts work with most popular word processing software, Ventura Publisher and Aldus Pagernaker.

WordPerfect Office Desktop Organizer Includes E-mail, Group Scheduling



HANDS ON

BY M. KEITH THOMPSON

WordPerfect Office is WordPerfect Corp.'s answer to groupware-software that focuses on increasing the productivity of groups, not just the productivity of individuals. The package includes all the features of Word-Perfect Library, including DOS menu manager, calendar, notebook, file manager, calculator, macro editor, and DOS text editor. The package also includes programs especially for workgroups-a group scheduler and e-mail. All of the programs follow the menu layout of the WordPerfect word processing software.

Finding the Time

The key function of WordPerfect Office is sharing. The programs make it easy to share names, notes, mail, and each other's time over a LAN. Office does a particularly good job of helping people in workgroup environments share office resources.

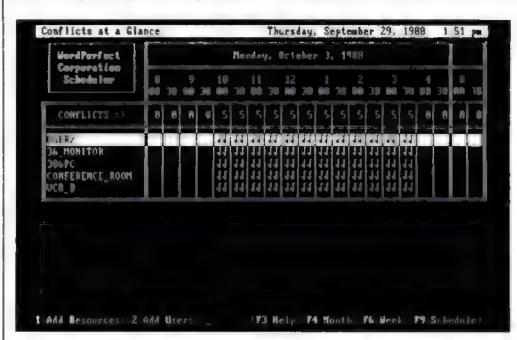
When you schedule a meeting, you name the people and resources-such as slide projector, office scanner, or 25-inch monitor—that you need. Each resource must list one person as its manager. The program examines the calendar for each person and resource and shows you open and conflicting times by putting check marks and open spots in a calendar on the screen. Once you select a time and date, the program asks each person and the manager of each resource to confirm the scheduled meeting.

Of course, no scheduling program is effective if people don't keep their calendars updated. Office's easy-to-use calendar should help keep the calendars up to date. The calendar allows you to specify the frequency of time/line entries (every 5 minutes, 30 minutes, and so forth) and includes a 255-character memo field for re-

minders. An auto-date schedule feature lets you use any formula imaginable—like "every Thursday that falls on the 23rd of the month"—for specifying regularly occurring events.

The e-mail package in WordPerfect Office lets you at-

ory manager that allows for multiple program residency and transporting data between programs. WordPerfect Office can also automatically record your keystrokes and log the time that you spend within each program. The macro editor enables you to



The WordPerfect Office scheduling screen displays available and conflicting times for the resources and people requested for events.

sages, establish mailing lists, and easily reply to incoming mail. If you need it, the package provides you with a list of user names and lets you quickly mark the addressees. In a nice extra, the package also includes a phone message form for quick notification of calls.

The Office notebook is multiuser in the sense that if a file is being accessed, any concurrent access is read-only. The biggest drawback of the notebook is that it doesn't present a directory of the notebook files. You have to remember the name of the file when you want to retrieve it.

Miscellany

WordPerfect Office also includes a calculator, file manager, network shell, and macro editor. The calculator includes financial, programmer, statistical, and scientific modes. The file manager enables users to lock files and search text files for strings. Another useful feature is the ability to display the contents of any file on the screen.

The shell program is a mem-

change or create WordPerfect macros or create branching with macros.

Not Perfect

For the end user, WordPerfect Office is one of the best work-group application packages we have seen. The overall menu system and the interfaces to each program are so easy to use that anybody who knows the position of the keys on the keyboard can use Office.

The package is not without its problems, however. For starters, we didn't find this software easy to set up or install. The network administrator must be especially careful to set the proper search paths and public files for the package. The explanations in the System Manager's Guide are useful, but we still ran into time-consuming problems.

While the scheduling program makes it especially easy for users to schedule and request resources, it does a poor job of relaying the request to the resource manager. Office doesn't notify resource managers when someone has requested a re-

source. Instead, each resource manager must remember to check the calendar for every one of his resources on a regular basis.

Restricted Characters

For another annoyance, the manual does not mention that resources have restricted characters. When we gave a resource a name with a space in it, like "Slide Projector," the program informed us that a space was an illegal character. It seemed to allow dashes instead of spaces in a resource name, but when we tried to schedule that resource, we were told it was invalid.

And, while the e-mail package in Office provides good value for small networks, it lacks the capability to tie into other common mail systems from IBM, DEC, MCI, or Wang. It is increasingly important that a workgroup e-mail system can invisibly tie into a larger corporate or enterprise mail system.

Despite its problems, Word-Perfect Office fills the needs of many workgroups, and its ease of use—for the end user, if not the administrator—is a real plus. The program's interface should especially appeal to people who are already using WordPerfect software.



WordPerfect Office

WordPerfect Corp. 1555 N. Technology Way Orem, UT 84057 (801) 225-5000

List Price: \$495, first station; \$150, each additional station; upgrade from WordPerfect Library, \$40.

Requires: 512K RAM, networks that support DOS filelocking feature, DOS 3.0 or later.

In Short: WordPerfect Library reconstituted for networking and including group scheduling and e-mail. Extremely easy to use. Not copy protected.

CIRCLE 451 ON READER SERVICE CARD

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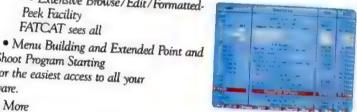
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*COMPLEAT. From Webster's:- "of or marked by a highly developed, wide ranging proficiency or skill."

WordPerfect 5.0

WordPerfect Corp.



PIPELINE

TOP TEN SELLERS

(A 5-week history)



y now, you've probably heard that Lotus won't be finishing 1-2-3, Release 3, for many more months. So far, the delay hasn't hurt Lotus's sales too badly, partly due to the company's promise to provide free upgrades on new purchases and the bundling of Funk Software's Allways add-in to enhance 1-2-3

dBASE III Plus 1.1

Ashton-Tate Corp.

printing.

Fastback Plus 2.01

If you were hoping that the delay means Lotus has decided to expand the features in Release 3 (see Pipeline, May 17, 1988), you'll be disappointed. If you're just hoping that performance doesn't suffer with all the new features, you're in the same boat as Lotus's programmers.

In explaining the delay, Lotus's development chief said that while programmers have gone a long way toward trimming down Release 3's code so that it runs under DOS (until recently, the model in development had been so large that it would only run under OS/2),

programmers are now contending with bugs and slow Fifth Generation Systems Inc.

IN PERSPECTIVE

The Top Ten Sellers list ranks PC business programs according to their sales performance in the last week of a 5-week period. It also tracks programs' rankings (reading left to right) from September 5 through October 8. A 5-week history is charted to give a sense of a program's sales strength over time. Dramatic shifts in a particular program's ranking may be the result of sales promotions conducted by individual retailers. Seasonal factors, such as end-of-year-budget purchase decisions, can also play a large role in the performance of a particular program in any period. More than 12,000 individual locations contribute to the list.

Sales information compiled by Ingram Software Inc. and PC Connection Inc.

performance. **Dac Easy Accounting 3.0** Dac Software Inc.

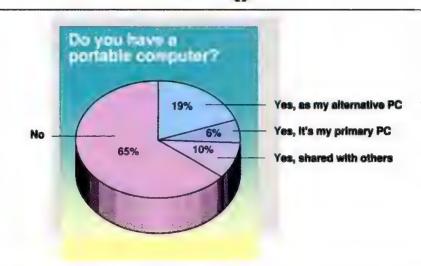
> Carbon Copy Plus 5.0 Meridian Technology Inc.

> > The Norton Utilities **Advanced Edition** Peter Norton Utilities

> > > Rankings are based on net sales by unit: returns are subtracted from gross sales.



Letters from readers and visiting user groups are a couple of ways that PC Magazine editors find out what you're interested in learning more about. But PC MagNet surveys are proving to be the fastest and most far-reaching method for us to get a quick snapshot of where reader opinion stands. These questions are taken from a survey prepared by our executive editor of features, Bill Howard, to help him select story topics in 1989.



Digital Video

Were you consumed with desire as you read news reports about the stunning graphics and audio that Steve Jobs has built into the NeXT computer? Sit back for a minute. At roughly the same time next spring that the NeXT machine ships to schools, a new PC board from Intel will give you voice-quality sound with graphics that far surpass NeXT's photographic-quality black and white display -Intel's board will generate video-quality live-action color graphics.

Intel will market a Digital Video Interactive (DVI) board for roughly \$3,000 that's able to read compressed image files off CD drives and generate TV-quality images while driving external speakers via common radio-jack plugs in the board. If your PC has a multiscanning monitor and a DOS-compatible CD drive, all you'll need is the one board and the speakers of your choice.

DVI is a product of RCA's Princeton, New Jersey, research lab. It was first publicly shown in early 1987 and has since vied for respect with a similar standard—CD-I, or Compact Disc-Interactive (developed by Sony and Philips). Both give a



This DVI (Digital Video Interactive) application under development uses video images filmed at the site of Mayan ruins in an educational program. When Intel releases the first DVI board next year, DVI programs will run on PCs equipped with multiscanning monitors and CD drives. The video and decompression processor on the board runs at about 12 million instructions per second.

PC access to lifelike graphics and realistic sound, but DVI has the advantage of using the same high-Sierra standard CD players that are now used for programs like Lotus One Source, Microsoft Bookshelf, and Ziff's Computer Library. Still, DVI couldn't go far without a sponsor who has clout with computer makers and was willing to devote the resources to build a commercially feasible product.

GE bought RCA last year, but, lacking access to personal computer industry market channels, it let DVI languish. Intel recognized the latent potential and acquired rights to the technology in early October for an undisclosed amount of cash; GE retains royalty rights, but Intel has complete control.

Right now, DVI hardware consists of a three-board set, with several daughterboards, that takes up four PC slots. Intel plans to have the hardware reduced to a single board by the second quarter of 1989 and, amazingly, expects to have the entire configuration down to a single chip set that can be used on a PC motherboard by early 1990. Although the first boards will cost roughly \$3,000, Intel believes DVI features will sell for as little as \$500 in early 1991.

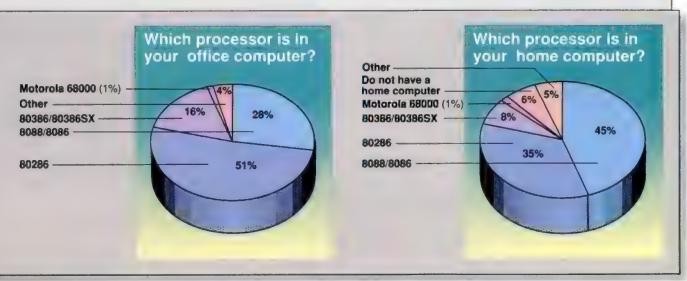
The greatest hurdle that DVI overcomes is the vast data stor-

age requirements of graphic files; for instance, an analog video frame at 512 by 400 pixels normally needs 600K of space. Since live action needs 30 frames per second, you'd need a truckload of floppy disks to store a few minutes of video. A CD has more space, but it would be quickly exhausted and would force lots of stop action, thanks to its slow access time without DVI.

DVI hardware does virtually spontaneous decompression, gulping images off the compact disk in advance so presentations run smoothly. Over an hour's worth of video fits on one disk. The pixel processor runs at 12.5 million instructions per second. Resolutions up to 1,024 by 512 with up to 16 million colors are possible.

Lotus and Microsoft say they're going to develop DVI CD applications, and a host of smaller developers have educational programs ready now.

The success of DVI will be a big test of Intel's clout as a standard setter, but since virtually all of the PC system and peripheral makers now look to Intel more than anyone else for standards, the odds are that DVI will make it.—Gus Venditto





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TheComplete PC

Zeos 386-25/V: Low-Cost 25-MHz Tower Packs 64K Cache, Leaves Room to Expand



HANDS ON-

BY ALFRED POOR

The Zeos 386-25/V looks a lot like most of the new AT and 386 clones available in tower form. But comparing the Zeos with a typical clone is a bit like comparing the Space Shuttle booster rocket with a helicopter rotor. Zeos has joined industry leaders such as Compag, IBM, and ALR in offering a 25-MHz 386based machine.

But there is more to the new Zeos than clock speed. Built around a motherboard from American Megatrends, it can accept a variety of memory chips and SIM packs. Our evaluation unit arrived with 1MB of RAM made up of 256-kilobit, 80-nanosecond chips. The same board can be configured with 1megabit chips, however, and when used in conjunction with 1MB SIM packs as well, you can get a full 8MB of fast 32-bit memory on the motherboard.

If you need to go beyond that generous endowment, you can add a proprietary 32-bit memory card, which can hold up to 24MB more. The motherboard is also designed to use 4-megabit chips, once they become available in quantity, so you may never even need the expansion board.

The Zeos goes further by giving this fast RAM some help. It sports a 64K cache of 25-ns. static RAM. As a result, it turns in some of the fastest times yet on the PC Labs benchmark tests.

The system appears to be well-engineered. For example, while many other machines emulate slower clock speeds by idling the CPU, the Zeos uses a separate crystal to drive the CPU at the lower speed.

The tower case is sturdily constructed, with substantial cross beams at strategic points. The top portion of the case is dominated by a stack of six halfheight disk drive bays. Unlike most clone desktop cases, this one does not use mounting rails to install drives; you screw them directly to the bay housing. The back of the case has cutouts for five 25-pin connectors and three more 9-pin connectors, making it easy to place the extra serial ports required by some of the new multiuser 386 operating systems. The 230-watt power supply should also be ample for even the most ambitious expansion plans.

Best of all, the Zeos 386-25/V is impressively affordable. Our \$9,308 evaluation unit had a fast ESDI 157MB hard disk, a 25-MHz 80387 math coprocessor, a Paradise VGA card, a Taxan VGA color monitor, and a base of 1MB of

There are few signs that Zeos has cut corners to keep the costs down, but you'll find some if you look. For example, the VGA card is of the 8-bit variety. A 16-bit card would perform better; Compaq's is about twice as fast in the PC Labs video benchmark tests. The Zeos keyboard is not likely to stun too many buyers either.

If you're looking for one of the fastest rides around at a down-to-earth price, don't pass up the Zeos. Solid construction. flexible design, and escape-velocity performance make it a topflight choice.



FACT FILE

Zeos 386-25/V

Zeos International, Inc. 530 5th Avenue NW, #1000 St. Paul, MN 55122 (800) 423-5891 (612) 633-4591

List Price: \$6,114 with VGA, monitor, 1MB RAM, 40MB drive, 1.2MB floppy disk drive, parallel port, serial port, keyboard; \$9,308 with 157MB ESDI drive and 80387 math co-

In Short: Flexible design for easy expansion and one of the lowest prices yet for 25-MHz performance.

CIRCLE 437 ON READER SERVICE CARD



Benchmark Tests: Zeos 386-25/V vs. ALR FlexCache 25386 and S IBM PS/2 Model 70-A21

he reigning speed champion, the ALR FlexCache 25386, retains its title, but the Zeos 386-25/V comes close enough to give it some competition. Although the IBM PS/2 Model 70-A21 performs slightly better than the Zeos in the memory tests, the ALR and the Zeos surpass the IBM in disk throughput.

Performance Times (Times given in seconds)	80386 Instruction Mix	Conventional Memory	File Access (small record)	File Access (large record)
Zeca 366-25/V	2.29	0.31	55.26	5.05
IBM PS/2 Model 70-A21	2.25	0.30	71.49	6.53
ALR FlexCache 25386	2.20	0.27	55 07	4.98

The 80386 Instruction Mix benchmark test measures the time it takes to execute a selected senes of processur-intensive tasks. The test program uses 80386 instruction code. These instructions are a subset of the total processor instruction set. The 80386 Instruction Mix implements a number of 32-bit operations, in the 80386 processor these become single instructions, whereas in the 8086 and 80286 versions of the benchmark test they remain multiple instructions

The Conventional Memory benchmark test allocates 256K of conventional memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory The result shown is the average of the read and write

The DOS File Access benchmark test measures the throughput rate of the disk being tested. In this case, throughput times are measured in terms of how long the disk takes to perform common DOS file-manage-

Page Hode Torke **Relative Times** (IBM PS/2 Model 70-A21=100)

> ment functions. Five tasks-file creation, sequential file. write, sequential file read, random file write, and random

file read-are timed and the results summed The test is carried out for two different types of -small record files and large record files-that are used by common PC applications. Files created using small records are typically used by database management programs, and large records are typically used for word processing and spreadsheet files. Loading a DOS program is also simulated by the large-record test

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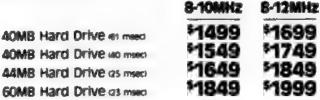
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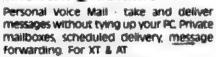
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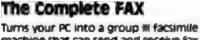




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PubTech File Organizer for Windows Adds Icons, Applications Menus



HANDS ON

BY BARRY SIMON

Publishing Technologies' Pub-Tech File Organizer for Microsoft Windows presents an impressive and powerful alternative to the MS-DOS Executive that normally runs under Windows.

First, PubTech provides a Windows manager. Commands to tile or cascade all open windows are added to the control menu of every Windows application. You can make a single applications menu that allows you to call your applications with hotkey combinations such as Alt-Shift-A.

Second, PubTech provides a full graphical interface, including icons for each file, your printer, and your disk drives. Directories are represented as folder icons. To copy a group of files from one directory to another, you open windows for both directories and single-click on each icon that represents a file you want to copy. Dragging one of the icons to the other folder copies all of the marked files. To print, you drag one of the icons to the printer. You can

also delete the files by dragging one of the file icons to the garbage can.

While PubTech cannot display your directory structure in the ever-popular tree representation, its graphical interface surpasses the power of many other file organizers. For instance, you can act on a subdirectory, and all of its subdirectories, by dragging that subdirectory's folder icon.

Third, PubTech comes with a powerful editor to replace the

Windows Notepad. It has full macro control and a multistep undo that's limited only by memory.

The complete graphical interface is carried to extremes. For example, the key-redefinition screen is a visual keyboard. The only way to redefine a hot-key combination—to Alt-Shift-A, for example—is to click on the three keys. Typing the keystrokes would be as easy, if not easier.

The interface also makes it



PubTech File Organizer
Publishing Technologies Inc.
7719 Wood Hollow Dr., #260
Austin, TX 78731
(512) 346-2835

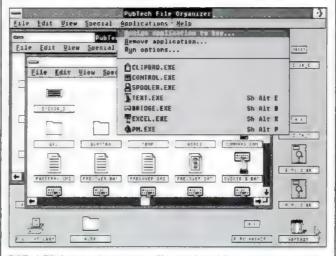
List Price: \$145

Requires: 512K RAM; Microsoft Windows/286 or /386, Version 2.x; mouse recommended; DOS 3.0 or later. Not copy protected

CIRCLE 430 ON READER SERVICE CARD

too easy to delete entire subdirectories without quite realizing it. Move the folder corresponding to the root directory to the garbage can, and you have deleted your entire disk. The program allows you to retrieve files from the garbage can and even includes an unerase function. But that single folder in the garbage can hides a lot; *PubTech* provides no easy method of realizing that a folder contains subfolders.

Despite these few shortcomings, PubTech File Organizer is an excellent file-management program. Of the half-dozen Windows managers I've tried, it is the one that appeals to me the most.



PubTech File Organizet lets you route a file to another subdirectory or to an output device by moving the file icon to the appropriate directory or device icon.

Getting a Handle on IBM's SNA



BOOK REVIEW

BY SALVATORE P. RICCIARDI

Chances are if you work for a large corporation and it's an IBM shop, then at one time or another you are going to encounter Systems Network Architecture (SNA), IBM's netarchitecture work for distributed processing. SNA: IBM's Networking Solution, by James Martin and Kathleen Kavanagh Chapman, is a wellwritten 380-page treatment of the concepts, protocols, components, and capabilities that compose SNA.

The book is one of a select few currently available that cover this challenging topic. It is also one of the most up-to-date treatments of SNA available outside of IBM.

For example, two entire chapters are devoted to covering IBM's Advanced Program to Program Communications and Logical Unit 6.2 protocol. Coverage includes an explanation of SNA's functional layers and their relationship to the OSI model, as well as a discussion of SNA extensions such as SNADS and DCA/DIA. Also discussed are some of IBM's software products used to implement an SNA network, such

as ACF/VTAM and ACF/NCP.

Some 28 chapters cover SNA from an architectural standpoint and also include detailed information on many important aspects of SNA. For example, the SDLC link-layer protocol employed by SNA is examined in detail, including message formats and protocol semantics. As such, the book is well suited to both the corporate manager needing to understand SNA at a high level and the SNA software specialist looking for an understandable addition to IBM's documentation.

The book's diagrams and illustrations are frequent and extremely well designed; they're particularly valuable in helping you understand the complexities of SNA.

SNA is as obscure as it is large, and understanding it can be rather difficult. Whether you are a high-level manager needing to separate LUs from PUs or a systems-level person looking for a lucid explanation of some of SNA's trying technical details, SNA: IBM's Networking Solution is a worthwhile investment

List Price: SNA: IBM's Networking Solution, by James Martin and Kathleen Kavanagh Chapman, \$50. ISBN: 0-13-815143-1. Prentice-Hall Inc., Englewood Cliffs, NJ 07632; (201) 767-5937.

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PFS:First Graphics Takes Feel, Features from Harvard Graphics



HANDS ON

BY JENNIFER ZAINO

Software Publishing's Harvard Graphics just got a baby brother. But not to worry—no sibling rivalry is expected to erupt between the two. While Harvard Graphics is aimed at the highend user, the \$149 PFS:First Graphics is slated for the graphics dabbler who wants to make effective presentations at a low price.

PFS:First Graphics uses most of the same function key commands as Harvard, and the similar menu-driven interface makes PFS just as easy to use. Of course, you don't get Harvard's full range of features with PFS; slide show support, draw options, clip art, arithmetical and statistical calculating options, and a spelling checker are noticeably absent.

However, the package has more than enough features to keep the occasional graphics user satisfied. A fairly complete set of chart types—including text (bulleted and free-form), pie, column, bar/line, point, area, and high/low/close charts—is available, as is a 16-color palette and fill patterns. Charts have room for a title, a subtitle, and a footnote. You can alter their point sizes and specify other attributes, such as color, bolding, italics, and underlining. You can also add a grid, adjust axis scaling, or move the

legend location.

Of course, you don't have to do any of this. You'll err on the side of safety if you stick with *PFS*'s default size and layout choices.

You can input data directly into the program, or import from .WKS, .WK1, .WRK, .WR1, and ASCII files. You can export charts to PFS: Professional Write and Harvard



PFS:First Graphics has five fonts, but only one can be used per chart.

FACT FILE

PFS:First Graphics

Software Publishing Corp.

1901 Landings Dr. P.O. Box 7210

Mountain View, CA 94039

(415) 962-8910 List Price: \$149

Requires: 320K RAM, graphics display, DOS 2.0 or later.

Not copy protected.

CIRCLE 431 ON READER SERVICE CARD

Graphics. PFS supports a variety of printers and plotters, including Hewlett-Packard, Houston Instrument, IBM, Epson, and Toshiba.

PFS:First Graphics lets you display two pies, two columns, or a combination of these in the same chart. You can also explode a slice of a pie or column and "link" it to another to show a breakdown of the elements in the exploded slice.

Harvard Graphics is still a top choice if you need sophisticated graphics at any price, but the ease of use and preformatted layouts of PFS:First Graphics make it a good choice for the occasional graphics user.

\$99 Package Safeguards System



HANDS ON

BY MARY KATHLEEN FLYNN

If you're tempted to put a padlock on your computer to keep out unwanted users, you may want to install SoftSafe instead. The \$99 security package incorporates passwords to keep out everyone but the people you choose to let in. To prevent even that trusted few from seeing confidential files, the product also offers file encryption.

SoftSafe recognizes one owner for each hard disk. This owner can give access to eight users, change their passwords, and see all encrypted files on the disk. If you're a nonowner user.

you're allowed to call up nonencrypted files, encrypt and unencrypt your own files, and change your password.

Designed for ease of use, SoftSafe comes with a Quick Start card that instructs you to type A:INSTALL and then follow screen instructions. If Soft-Safe can't access your hard disk, it displays an 800 tech support telephone number.

Sound easy? It should be, but in my tests the automatic installation didn't always work. At press time, Software Directions was still fixing a few bugs and testing the product for compatibility with non-IBM machines.

After it's installed, SoftSafe locks up your hard disk every

time you boot, log off, or press Ctrl-Alt-L. A screen asking for the user's name and password comes up instantly. To encrypt a file, you just put it in a subdirectory, the name of which contains the encryption word you defined during installation. All authorized users can gain access to "safe" directories, but only the owner will be able to access other users' files. Unfortunately, you can't change your encryption word without reinstalling the program.

Whenever you boot up, Soft-Safe offers to check for viruses by comparing current system files with information obtained upon installation.

SoftSafe, which occupies 35K RAM, supports up to 16



SoftSafe

Software Directions Inc. 1572 Sussex Tpke. Randolph, NJ 07869 (800) 346-7638 (201) 584-8466 (in N.J.)

List Price: \$99

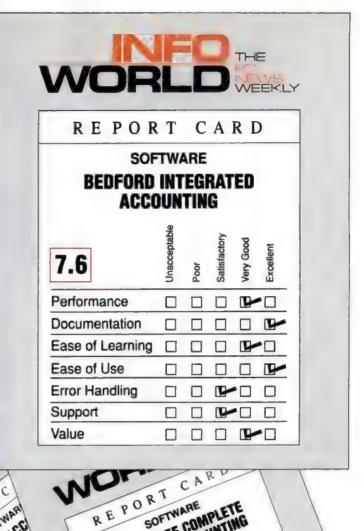
Requires: 192K RAM, DOS 2.0 or later. Not copy protected.

CIRCLE 447 ON READER SERVICE CARD

disk partitions. It does not act on files in a virtual disk, but it doesn't interfere with a virtual disk either.

Once past installation, I found SoftSafe an easy-to-use tool for guarding my hard disk—from nosy colleagues as well as from viruses.

Best in our class



"If we had to pick just one accounting system for a company getting its first PEACHTREE COMPLETE BUSINESS ACCOUNTING SOFTWARE 6.7 Performance Documentation Ease of Learning

computer, we would choose Bedford Integrated Accounting. Bedford is quick and easy to use, with a small number of options that limits confusion" InfoWorld, Nov. 16, 1987

\$249 Suggested List

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GRIDCase 1535 EXP Offers Removable AT Expansion Slots

GRiD Systems adds the GRiD-Case 1535 EXP battery-powered laptop to its line of rough-and-ready computers to take into the field. Encased in durable, black magnesium like the rest of the 1500 series, the \$7,495 machine has an 80386 microprocessor, operates at 12.5 MHz, and has a removable tray that provides two PC-XT/AT-compatible expansion slots.

The GRiDCase 1535 EXP

comes with standard features like a 40MB hard disk, 1MB RAM (expandable to 5MB), and a 10-inch 640-by-400, high-contrast backlit LCD screen. It weighs 12 pounds (16 pounds with the tray attached). A gas plasma display, 2,400/1,200/300 bit-per-second internal modem, and 80387 arithmetic coprocessor are all optional.

List Price: GRiDCase 1535 EXP, \$7,495. GRiD Systems Corp., 47211 Lakeview Blvd., Fremont, CA 94538; (415) 656-4700.

CIRCLE 444 ON READER SERVICE CARD

Computer Aids For Handicapped Users

People who have trouble using computers because of input-device inflexibility can now take advantage of several software and hardware products that address these problems. PECK, a \$9.95 software package from Productivity Software International, lets users press keys sequentially instead of simultaneously. A warm reboot, for example, can be performed without hitting the Ctrl, Alt, and Del

keys at the same time.

Radio Shack is selling a line of adaptive devices for Tandy computers. All require the \$300 PC Serial A.I.D. Interface, manufactured by Designing Aids for Disabled Adults. The device accepts input from scanners, alternative keyboards, and single- or dual-switch Morse Code. The \$325 Unicorn Expanded Keyboard has a touch-sensitive flat panel and 128 large, user-definable squares and is also compatible with

(continues on page 52)



Picture Publisher from Microtek Allows You to Edit Gray-Scale Images

If you see the world in shades of gray, Microtek Lab thinks it has the tools to improve the view. The first is Picture Publisher, a \$595 gray-scale editing program that allows manipulation of scanned images with up to 256 shades of gray.

Users will be able to precisely crop, size, scale, and rotate images, assemble multiple-image collages, opaque, smooth, and sharpen images, and create a limitless number of gamma curves to adjust photographic highlights, midtones, and shadow areas.

Picture Publisher imports images in the .TIF file format, as well as images from Microtek's own gray-scale scanners, such as the new MSF-300Q, a \$2,495 64-gray-scale scanner that the company claims costs \$1,000 less than its nearest competitor.

The scanner, which comes with either a PC-XT/AT or a PS/2 Micro Channel interface, can operate in a space-conserving, ''single-bit-per-pixel mode' for black-and-white images, or a gray-scale "multibit-per-pixel mode."

List Price: Picture Publisher, \$595. Microtek MSF-300Q, \$2,495. Requires: Picture Publisher: a VGA card and Microsoft Windows. Microtek Lab Inc., 16901 S. Western Ave, Gardena, CA 90247; (213) 321-2121.

CIRCLE 441 ON READER SERVICE CARD

Tektronix's Phaser CP Brings Color PostScript to Office Printers

The Phaser Card is the first printer controller to interpret color PostScript and the first PostScript-compatible controller that drives both color and monochrome printers, according to Tektronix. It features a Motorola 68020 microprocessor, comes with 8MB RAM. and is available configured for color (\$6,000) or monochrome (\$3,000). The card supports HPGL, Hewlett-Packard's standard plotter language, and Tektronix thermal-wax-transfer and Color Image printers.

Two new printers incorporate the Phaser Card. The Phaser CP color thermal-wax-transfer printer produces A-size and legal-size color output at a rate of 45 seconds per copy and monochrome at 30 seconds per copy. The printer sells for

\$12,995 configured for color; a monochrome upgrade costs \$3,000 extra.

At \$9,995, the new Tektronix Phaser LP is the first Bsize laser printer for under \$15,000. It produces five B-size and eight A-size prints per minute, at a resolution of 300 dots per inch. For an additional \$6,000, another Phaser Card gives it color capability. List Price: Tektronix Phaser CP, \$12,995 for color; \$3,000 for monochrome upgrade. Tektronix Phaser LP, \$9,995; \$6,000 for color upgrade. Either system fully configured, \$15,995. Requires: IBM PC AT or compatible.

Tektronix Inc., 26600 Southwest **Pkwy.**, Wilsonville, OR 97070; (503) 685-3585.

CIRCLE 430 ON READER SERVICE CARD



with the new Phaser Card, can interpret color PostScript files.

ATWO THE MARKET

Computer Aids

(continued from page 51)

many portable speech aids. Radio Shack also markets ability switches, produced by Technical Aids and Systems for the Handicapped Inc. An example is the Pneumatic Dual Switch. for \$220, which is operated orally.

List Price: PECK, \$9.95. Requires: 1K RAM. Productivity Software International Inc., 1220 Broadway, New York, NY 10001; (212) 967-8666.

CIRCLE 442 ON READER SERVICE CARD

List Price: PC Serial A.I.D. Interface, \$325. Unicorn Expanded Keyboard, \$325. Pneumatic Dual Switch, \$220. Requires: All devices require a Tandycompatible computer and the PC Serial A.I.D. Interface. Radio Shack, 1700 One Tandy Center, Fort Worth, TX 76102; (817) 390-3011.

CIRCLE 443 ON READER SERVICE CARD

Samna's Ami Word Processor for Windows Integrates Graphics and Text

Samna is hoping to win friends among word processing software users with Ami, one of the first full-featured word-processing packages. The \$149 package is a true Windows application that offers style sheets and easily integrated graphics, according to Samna.

Ami can import files in AS-CII, .PCX, or .TIF formats, as well as files from other Samna packages, WordPerfect, and WordStar. A "frames" feature lets users create blocks of text or graphics that can be placed anywhere on a page with text wrapping around or flowing beneath them. Graphics within frames can be scaled, repositioned, or cropped.

For standardizing documents, users can employ Ami's predefined style sheets or configure their own.

Ami has two editing modes: "draft mode," an unformatted, text-only display,

WYSIWYG "layout mode," in which the document appears as it will be printed and text is formatted as it is entered or edited. Format changes appear instantly for confirmation before returning to the document.

Among the printing options are portrait/landscape, reverse order, collate, and automatic pair kerning. More prosaic features include headers and footers, a 130,000-word spelling checker, context-sensitive help, and a full Undo command. Use of a mouse is optional.

List Price: Ami. \$149 until March 15, 1989; \$199 afterwards.

Requires: 640K RAM; hard disk; Hercules, EGA, or higherresolution graphics adapter; DOS 3.0 or later. Includes a runtime version of Microsoft Windows. Not copy protected. Samna Corp., 5600 Glenridge Dr., Atlanta, GA 30342; (404) 851-0007.

CIRCLE 439 ON READER SERVICE CARD

Toshiba Introduces Two New Portables

Adding to its growing list of computers-to-go, Toshiba delivers its most powerful portables, the 20-MHz 80386-based T5200 and the battery-powered, 80C286-based T1600.

The Toshiba T5200 weighs 18.7 pounds and sports a detachable, VGA-compatible, gas plasma screen with 16 gray scales. Toshiba offers two models, one with a 40MB hard disk drive (\$9,499), the other with a 100MB drive (\$10,999).

Two expansion slots help minimize separation anxiety from desktop systems-a fullsize 16-bit and a dual-function. half-size IBM-compatible 8-bit or Toshiba 16-bit. Standard features include 2MB RAM, expandable to 8MB, and a 32K static RAM cache with an





82385 cache controller.

For the battery-power hungry, the \$4,999 11.6-pound Toshiba T1600 uses removable. rechargeable batteries: one is standard, but there is room for a second one.

A 20MB hard disk drive. 1MB RAM, and a detachable backlit supertwist EGA display are standard, as are separate ports for a parallel printer, a 51/4-inch external drive, and an external numeric keypad. List Price: Toshiba T5200, with 40MB hard disk, \$9,499; with 100MB hard disk, \$10,999. Toshiba T1600, \$4,999. Toshiba America Inc., Information Systems Division, 9740 Irvine Blvd., Irvine, CA 92718; (714) 583-3000.

CIRCLE 440 ON READER SERVICE CARD

Toshiba's 80386-based T5200 laptop (above) has a VGA-compatible display and two IBM-compatible expansion slots. The 80C286-based Toshiba T1600 laptop (right, top) uses removable, rechargeable battery packs.

Trainable Read-It! OCR Software Learns New Typefaces, Costs \$495

Optical character recognition is one weapon in the war on paper but, until recently, high prices kept the technology out of most offices. Read-It!, a \$495 software package from Olduvai, is one of several recent solutions that bring OCR prices a bit closer to earth.

The package runs under Microsoft Windows and allows most scanners to function as an OCR system. Olduvai says the package recognizes proportionally spaced characters as well as monospaced characters. Read-It! comes with a selection of predefined "type tables" that allow it to recognize most popular typeset, typewriter, dot matrix, and laser printer typefaces. The software can also learn new typefaces, enabling it to handle a virtually unlimited range of various fonts and styles.

Read-It! uses pattern recognition algorithms to recognize serif and sans serif typefaces that range in size from 7 points to over 36 points. It can also recognize mixed point sizes in the same document, as well as kerning and ligatures. Olduvai claims an accuracy rate of up to 99.5 percent.

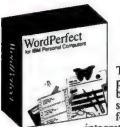
Drivers for Canon/Princeton, Microtek, and Hewlett-Packard scanners are included with the package. Read-It! also reads files from any scanner that supports the .TIF format.

List Price: Read-It!, \$495. Requires: 640K RAM (expanded memory recommended), 80286 or 80386 processor, hard disk. scanner, Microsoft Windows, DOS 3.2 or later. Not copy protected. Olduvai Corp., 7520 Red Rd., Suite A. South Miami, FL 33143: (305) 665-4665.

CIRCLE 446 ON READER SERVICE CARD

1-800-441-FAST

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can't lose.

List \$495

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integration, page preview and much more. WordPerfect 5.0, still retains its feel and ease of use that made it #1. Combine this with the best support in the industry and you

TOSHIBA T1000

The Toshiba T1000 is the

perfect second
PC! It comes with 512K
of ram, a 720K floppy drive, a
supertwist LCD screen and MS-DOS in rom! All this in a battery-powered 7 pound package. A 768K ram card is just \$269 and can be set as base, expanded, or a non-volitile ram disk.

TOSHIBA I **Printers**

These 24 pin models are loaded with features and are priced right.

You can select multiple fonts and pitches right from the menu-driven front control panel. With paper parking, you can insert a single sheet without removing the continous form paper. All this and multiple emulations with no dip switches.

P321SL Narrow P341SL Wide

\$459 **\$629**

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129 84

\$375 Star Micronics Prints Seven Colors, Three NLQ Fonts



HANDS-ON

BY JONATHAN MATZKIN

Color makes otherwise dull output jump off the page, but for most PC users the world is still black and white. With its \$375 NX-1000 Rainbow, Star Micronics attempts—with some success—to provide a color printer that is inexpensive, versatile, and useful to a wide variety of users.

The compact (4.3 by 15.1 by 11.3 inches, HWD) 9-pin dot matrix machine performs fairly well as a basic dot matrix printer. It prints in draft quality at 64 characters per second, and NLQ (near-letter-quality) print speed is a stately 20 cps. It won't set any speed records, but for personal or light professional work the NX-1000 Rainbow is fast enough.

In addition to the draft font,

which is somewhat fainter and rougher than those of some competing machines, the NX-1000 Rainbow has three NLQ fonts. The Courier typeface is about what you'd expect from a 9-pin printer, but the Sanserif



and Orator styles are well formed and attractive. The Orator typeface prints with either normal lowercase characters or small capitals. As with the draft typeface, the NLQ characters could be a bit darker, but overall, the NX-1000 Rainbow generates good-looking text output.

Of course, color output is the main reason most users would be interested in the machine. The Rainbow prints in seven colors, four ribbon colors plus three produced by dithering. But, aside from the obvious resolution limitations that go along with a 9-pin printhead, the lack of software drivers presents a serious problem.

I was able to generate colorful, attractive charts using PFS: First Publisher and its Epson JX-80 color driver. The Rainbow emulates the JX-80 with good results. But a search of other graphics packages turned up relatively few that support color dot-matrix printers. One can hope that publishers will supply drivers for the NX-1000 Rainbow.

Star Micronics has neatly solved the driver problem when it comes to text. You can change text output color by imbedding



Star Micronics NX-1000 Rainbow

Star Micronics America Inc. 200 Park Ave., #3510 New York, NY 10166 (212) 986-6770

List Price: \$375 Requires: Graphics package with NX-1000 or Epson JX-80 driver, parallel port.

CIRCLE 432 ON READER SERVICE CARD

simple commands into any word processor document. These commands can also change fonts or invoke enhancements such as boldface.

The Star Micronics NX-1000 Rainbow is a good allaround printer for home users, students, or professionals with moderate printing needs. Its color print features allow you to spruce up documents and generate nice-looking graphics provided you have the appropriate drivers.

Make Your Word Processor Feel at Home with Laser Fonts



HANDS-ON-

BY EDWARD MENDELSON

Why spend \$199 on a soft font installation program when WordPerfect Corp. or Microsoft will give you Bitstream's Fontware package for nothing when you buy WordPerfect or Microsoft Word?

SoftCraft's Laser Fonts, Version 4.0, gives you plenty of reasons. Unlike Bitstream's Fontware, Laser Fonts doesn't create soft fonts, but it installs into WordPerfect or Word any soft font from any vendor or font-generating program. WordPerfect users can also install fonts with specialized symbol sets and use the same fonts in multiple applications.

Fonts installed by Laser Fonts work exactly like the fonts listed in the standard drivers that come with WordPerfect or Word. You can choose the new fonts from the word processors' font menus and download them automatically at print time. Unlike all other font-management programs, Laser Fonts adds soft fonts to existing printer drivers, so you can use any soft font in the same document with any of the Hewlett-Packard LaserJet's standard-cartridge or internal fonts.

Laser Fonts can create outline and shadow versions of any soft fonts and install them in the same way it installs standard fonts. The package also comes with utilities that capture graphics images for printing in Word-Perfect or Word and that convert graphics files among .PIC, .PCX, and .TIF formats. You also get some sample soft fonts and a downloading utility for good measure.

WordPerfect users get extra benefits, such as automatically installed kerning tables and automatic translations of special symbol sets into WordPerfect's elaborate character set. Until now, you couldn't use the same soft fonts in WordPerfect and in PageMaker or Ventura Publisher because each program uses a different symbol set. Laser Fonts lets WordPerfect access all the characters in PageMaker and Ventura fonts-or any other standard font-and does the job transparently to the user. With SoftCraft's \$99 licensed version of Bitstream's Fontware, you can create your own custom symbol set for technical or foreign-language use, and let Laser Fonts install it automatically into WordPerfect.



F A C T F I L E

Laser Fonts, Version 4.0

SoftCraft Inc. 16 N. Carroll St., #500 Madison, WI 53703

(800) 351-0500 (608) 257-3300 List Price: \$199

Requires: 512K RAM, DOS 2.0 or later. Not copy protected.

CIRCLE 433 ON READER SERVICE CARD

SoftCraft's installation programs used to force you to learn incomprehensible commandline switches, but Laser Fonts 4.0 is entirely menu driven and works with a mouse or keyboard. Although soft fonts remain by far the most confusing element of word processing, SoftCraft's new installation and control programs make them more comprehensible and manageable than anything else on the market.

"Most people we meet who give Paradox a try, end up switching to it"

Mark Cook and Steve King, Data Based Advisor



Here's what Data Based Advisor had to say about Paradox:

"You'll find creating a Paradox database easy ... The real test of a DBMS isn't how easy it is to enter your data, but how easy it is to query that data, rearrange it, and perform calculations with it.

"The Paradox Query by Example (QBE) system allows you to easily structure queries from two or more databases . . . "

Even novices create applications without programming

"Any Paradox user, even a novice one, can easily use the Personal Programmer to generate menu-driven Paradox applications... The Personal Programmer works well all the time, even with long, complex applications. We found it can really simplify application development."

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Picades is a registered tradement of hose Selbivare. Jones is a Borlend International company Other brand and product source are tradements or registered tradements of their respective holders. Copyright # 1000 borlend International. Inc. "Finally, as the frosting on the applications developer's Paradox cake, it'll only cost you \$9.95 to buy the run-time version of Paradox to distribute [unlimited] copies of your application."

Macros save programming time

"What's really nice about Paradox macros is this: the program records them in the Paradox Application Language (PAL). Once you've recorded a macro, you can name it, save it, and re-use it. But best of all, when you start programming with PAL, you can include your macros as part of your PAL code, really saving programming time."



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Paradox gives you true concurrency on your network

"You'll find using Paradox on a network is exactly like using the standalone version. The real power of the Paradox NetPack shows itself when you simultaneously access a database being used by other people... The program elegantly handles all the chores of a multiuser database system with little or no effort by network users. Along with allowing you to almost instantly see changes made by other users, Paradox has very powerful automatic record locking features."

Report Generator is a joy to use

"If you've ever suffered with creating dBASE III PLUS reports, you'll find the Paradox Report Generator a real joy to use ... The Report Generator allows you to create headers and footers and to place fields wherever necessary to get the appearance you want."

Paradox is the one we choose!

"One of us is a confirmed Paradox user who has used the software since the beta-version of Paradox 1.0. The other just learned to use Paradox for this evaluation; he's decided to give up dBASE and switch."

Excerpts from Mark Cook and Steve King's review of Paradox in Data Based Advisor, January 1988.

See your Paradox dealer today

Your dealer can tell you more about the Paradox that's right for your environment: Paradox 2.0 for standalone or network users; Paradox 386, optimized for your 80386-based hardware; or new Paradox OS/2, coming soon to get the most from OS/2!

60-Day Money-back Guarantee*

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System Sleuth Solves System Mysteries



HANDS ON

BY LORI GRUNIN

System Sleuth, DTG's new \$149 diagnostic utility, is a useful program for anyone who needs to know anything about a system's configuration. It also lets you peer into the dark recesses of memory to see why two TSRs have each other in a hammerlock.

Initially, the program displays a system overview, which includes descriptions of the processor, ports, and ROM BIOS manufacturer and date. A map of installed memory also appears on-screen.

Through a series of menus, you can investigate the physical characteristics of the hard disk, get details about the display or I/O cards, or examine the contents of memory in ASCII or

hexadecimal format. Where applicable, System Sleuth reports segments, offsets, load addresses, and interrupts.

One particularly useful feature is the TSR table. It lists each TSR with its segment address, memory usage, and hooked interrupts.

For those who keep track of more than one system, System Sleuth's report generator will for up to 15 lines of comments.

Entirely menu-driven, System Sleuth supplies on-line help. You'll need to open the tersely written manual only for clarification of such items as I/O card memory segments, load addresses, or a brief discourse on processor architecture. And because it's a purely diagnostic program, System Sleuth won't

come in handy. It produces a printout of any combination of diagnostics, leaving you space

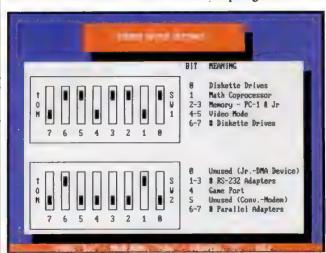
If you have to resolve program conflicts constantly or diagnose hardware-software incompatibilities, System Sleuth could prove a helpful addition to your software toolkit.

let you alter anything on-disk or

in memory.

List Price: System Sleuth, \$149. Requires: 256K RAM, DOS 2.1 or later. Not copy protected. DTG, 23704-5 El Toro Rd., #348, El Toro, CA 92630; (213) 987-2000.

CIRCLE 434 ON READER SERVICE CARD



tents of memory in ASCII or | System Sleuth displays a map of the DIP switches on your motherboard.

Squint-Free Laptop Cursor



HANDS ON

BY JONATHAN MATZKIN

The invention of the laptop was a red-letter day in the history of eyestrain. While the most expensive laptops do offer excellent screens, the more affordable models tend to have plain—as in not backlit—displays. So for many of us, squinting at a low-contrast display goes with the territory.

No-Squint Laptop Cursor, a \$39 utility from SkiSoft Publishing Corp., is designed to make working with these lessthan-ideal screens a little easier.

No-Squint replaces the hardware cursor on machines like the Toshiba T1000 with a larger, square cursor. To make it even easier to see, the cursor blinks at one of nine user-selectable rates, from a lazy on-off to a nervous near-blur.

To run the utility, you type LCD X at the DOS command line, where X is a number between 1 and 9 that specifies the blink rate. The numbers can be replaced with descriptive com-

mands like "LCD very slow."
You can also return to your machine's hardware cursor with an LCD OFF at the command line.

The larger, blinking cursor is definitely easier to see than

the standard sliver that my T1000 offers. In particular, I found it easier to locate on screens full of text. If you use a difficult-to-read laptop regularly, and often lose track of your cursor, No-Squint will help solve the problem. My only complaint is that the \$39 price tag seems a bit stiff for such a

modest, albeit helpful, product. List Price: No-Squint Laptop Cursor, \$39. Requires: 2K RAM, DOS 2.0 or later. Not copy protected. SkiSoft Publishing Corp., #79, 1644 Massachusetts Ave., Lexington, MA 02173; (617) 863-1876.

CIRCLE 435 ON READER SERVICE CARD

Power in a DOS Shell



HANDS ON

BY BARRY SIMON

DAC Micro Systems' Directory Commander, or dCom, Version 3.12, is an interesting DOS shell and hard disk organizer. Although its file-organizing abilities are fairly standard, dCom offers other features—such as a powerful macro language for programming function keys—that distinguish this product from other products in this crowded field.

Several other shells on the market—OVERVIEW and DIRWORKS, for example—allow you to define function keys so that a single program will run

on highlighted files. dCom carries its programmable function keys a step further by adding an elementary language.

dCom's macros allow you to run programs, perform simple loops, and receive user input. For instance, if you find yourself frequently combining several text files into one, it would take you about 10 minutes to assign the task to a function key. You could program the key to prompt you for a new filename and then append all the tagged files to that filename.

Other nice features include dCom's robust editor and a print spooler. Written entirely in assembly language, the program is speedy. And dCom lets you

unload memory-resident programs like SideKick that you accidentally called from dCom. With some other DOS shells, you have to reboot to unload resident programs.

Although it offers a lot, dCom is missing some features that are now standard. It lacks a visual tree and a command to show all the files on a drive.

Despite these shortcomings, dCom's special features make it an interesting option for those who like tinkering to get greater power in their DOS shell.

List Price: Directory Commander, Version 3.12, \$49. Requires: 53K RAM, DOS 2.0 or later. Not copy protected. DAC Micro Systems, 40941 176th St. East, Lancaster, CA 93535; (805) 264-1700.

CIRCLE 436 ON READER SERVICE CARD

"Those who are considering purchasing 1-2-3 will be better off with Quattro"

John Walkenbach, InfoWorld



Here's what InfoWorld had to say about Quattro

** There are some clear advantages in choosing Quattro over the 1-2-3 of today: easier installation, no copy protection, improved speed, much

better macros, excellent graphics, a customizable command interface. and direct compatibility with industry standard file formats. If cost is a factor, you can get five copies of Quattro for the same money that would buy two 1-2-3 packages."

Quattro includes SQZ!* Plus data compression

A special implementation of SQZ! Plus, the spreadsheet file compression utility, is built into Quattro and comes to you absolutely free. SQZ! Plus for Quattro automatically compacts and expands Quattro spreadsheets by up to 95% during file saving and retrieving.

Features: Improving the industry standard

"Quattro takes the industry standard and improves upon it in the areas that count most. It addresses many of the weaknesses of 1-2-3 and adds quite a few of its own unique touches."

"Perhaps Quattro's main advantage over most other spreadsheets is its minimal recalculation capability. When you make a change in your spreadsheet, only affected cells are recalculated, greatly speeding things up in most cases."

"Other Quattro features that improve upon the 1-2-3 standard include auto-record macros, vastly superior graphics, and easy installation."



Performance: Markedly superior to 1-2-3

"Our benchmark tests show Quattro markedly superior to 1-2-3 in file saves and retrieves."

"Quattro's graphics are a sight to behold."

"Ouattro makes working with macros practically painless. If you're into complex 1-2-3 macros, the debugging feature alone is good reason to make the switch to Quattro."

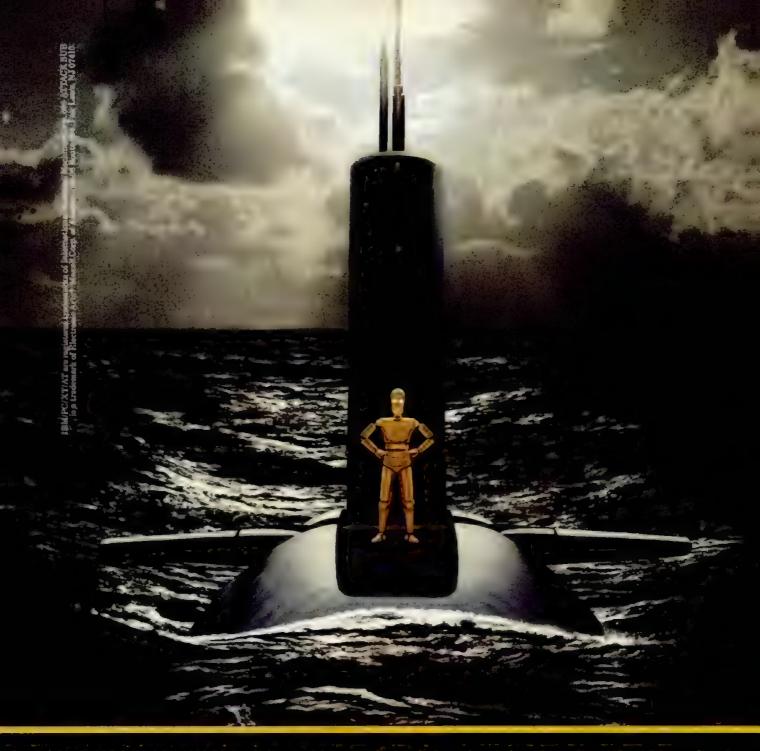
"No one can argue that Quattro is anything less than an excellent spreadsheet value. 33

Excerpts from John Walkenbach's review of Quattro" in InfoWorld, January 11, 1988.

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PC UPDATE

by Paula Seefeldt

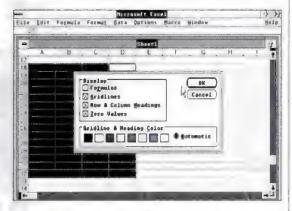
PC-File:dB Adds dBASE Compatibility

PC-File, from ButtonWare Inc., is now dBASE compatible. PC-File:dB, Version 1.0, provides dBASE III Plus file compatibility, full LAN support, and an increased file capacity. The graphics features now include multiple variables, stacked bar charts, and exploding pie wedges. ButtonWare is planning to also release a dBASE-compatible programming language in the first quarter of 1989. PC-File:dB 1.0 retails for \$89.95. ButtonWare Inc., Bellevue, Wash.; (206) 454-0479.

VPToolbox Expands Ventura Publisher's Style-Sheet Features VPToolbox is the file and style-sheet management system created to work with Xerox's Ventura Publisher. VPToolbox, Version 3.0, the upgraded release of the base product, has designed a report that shows every tag in a style sheet. VPToolbox/Advanced Edition has added global style-sheet editing and dBASE III exporting. VPToolbox/Network Edition supports file sharing in conjunction with the network version of Ventura Publisher. Version 3.0 retails for \$99, and Advanced Edition is \$149. The Network Edition will ship in January. System Network Architects, Princeton, N.J.; (609) 799-9605.

Excel 2.1 Accesses More Memory

Microsoft Excel for Windows can now access up to 45K more addressable memory. Version 2.1 also includes a technical manual, a Dialog Box editing utility, and support for 66 addition-



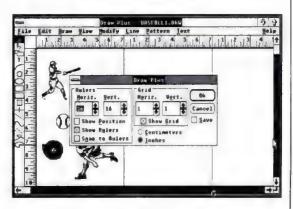
Microsoft Excel, Version 2.1, uses a Dialog Box editing function. al printers and color plotters. Upgrades are \$35 for Version 2.03 users and \$25 for Microsoft Windows/286 or /386 2.1 users. New packages retail for \$495. Microsoft Corp., Redmond, Wash.; (206) 882-8080.

Tax Ease Expands State Support

Tax Ease, the tax preparation package, is extending its service to an additional five states. Also, Tax Ease Professional has added another ten states to its service list. Tax Ease retails for \$79.95 and Tax Ease Professional is \$119. Park Technologies Inc., Clifton Park, N.Y.; (518) 877-5881.

Micrografx Draw Plus Accepts Scanned Images

Micrografx has reworked its Windows Draw program. The new Draw Plus uses context-sensitive help, scanned images, ruler snap mode, and eight color palettes with more than 100 colors. In addition, Draw Plus can connect and fill irregular objects and select, identify,



New additions to Draw Plus include ruler snap mode. and recall symbols. Upgrades are available to registered users of *Windows Draw* for \$149.95. New packages retail for \$395. Micrografx, Richardson, Tex.; (214) 234-1769.

XyWrite III Plus Supports LAN

XyQuest's XyWrite III Plus is now LAN compatible. XyWrite III Plus for Networks supplies multiple-user redlining that records the user's log-in date and time. The network version also has a memory management capability, a long directory feature, and a simplified printer selection. File Server versions retail for \$795, and node versions are \$195 each. Xy-Quest Inc., Billerica, Mass.; (508) 671-0888 . . . Time Line, Symantec's project management software, now offers network support. Time Line 3.0 is available at \$595 for a file server version, with individual LAN packs retailing for \$195. Symantec Corp., Novato, Calif.; (415) 898-1919.

Citizen Lowers Prices

Citizen America has lowered the prices of six of its dot matrix printers. Printers included in the price cut are the Citizen MSP-40, MSP-45, MSP-50, MSP-55, and the Citizen Tribute 124 and 224. Citizen America, Santa Monica, Calif.; (213) 453-0614.

TECH* GRAPH*PAD Adds ''Browse Mode''

Binary Engineering is shipping Version 3.0 of *TECH*GRAPH*PAD*, the engineering data software. New features include a worksheet "browse mode," an improved interface, and user-selectable color control. In addition, Version 3.0 reads and plots unlimited data points, uses "scroll-and-pick" file functions, and creates .PIC graphics files. Upgrades are available for \$99; new packages retail for \$395. Binary Engineering, Waltham, Mass.; (617) 35-0900.

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Next Month: How to Treat Impacted Foot in Mouth

From "Understanding Laptop Computers," an article in the August 1988 Dental Economics magazine:

"Future laptops may be 80386-based and capable of even more power and memory storage. Primary memory storage residing in tiny, integrated circuits encased in packages of plastic or ceramic permit the laptop to store and read data.

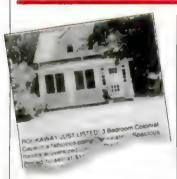
"Floppy disks provide secondary memory storage permitting the laptop computer to store data when data is not being used.

"Optional laptop hardware may include a metal or hard disk permanently sealed in its disk drive Future laptop computers may have hard disk drives of from 20 to 40 megabytes engineered to accommodate high-density, 1.44-megabyte floppy disks. Such machines would have enormous capacities for memory storage."

"The display screen accompanying a laptop computer is its primary means of visualizing information.'



Atari, the no-sweat computer solution. Advertisement in the Ottawa (Ontario, Canada) Citizen, June 3, 1988.



Surge suppressors, separate circuits, and dual quad outlets in every room? Ad from Morris/Sussex/Warren County, (N.J.) realty booklet, July 13, 1988.

New Math

"Are you tired of searching through four manuals to find the answer to one question? Do you and your co-workers feel pressured to become more productive?

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-Help wanted ad, Computing magazine, (London, England), June 4, 1987

News Flash

"IBM Corp. began making computer chips from the biggest wafers in the industry-platters that are 8 inches across, or about the size of a flying disk."

-Business item, printed in full, The Charlotte (N.C.) Observer, May 26, 1988

Newer Math

"Eighty to ninety percent of solving a problem is defining it precisely,' says Nat Cannon, CEO and founder of Imsatt Corporation, in Falls Church, Virginia, and developer of the Advanced Help System. 'Field technicians spend 70% of their time diagnosing problems and 40% fixing them.

-Information Center magazine, July 1988



Or would you rather have a free copy of Turbo Lightning? (Civic Computers ad in the San Jose Mercury News)

Truth in Advertising

"When you quit out of that accessory, the [Lotus Metro 1.1] Swapper returns the borrowed memory to disk, restoring RAM to its original state. You can now use the extra money for other, more productive tasks."

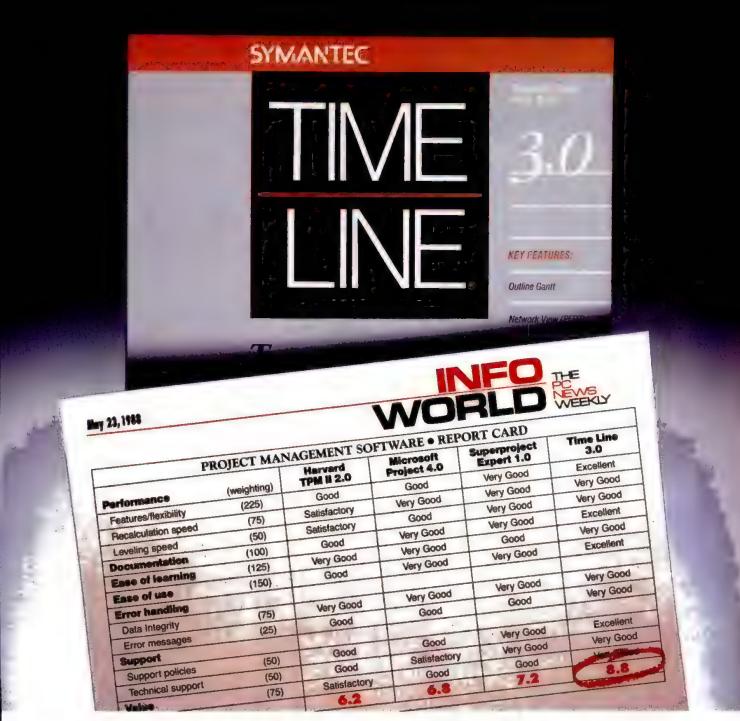
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CORK COMPUTERS? SURE, GO STRAIGHT DOWN THIS AISLE LINTIL YOU COME TO THE APROW SYSTEMS DUDE RANCH BOOTH, THEN TURN RIGHT AND GO TO THE GIANT BUDDHA WITH A GUY BREAKING BRICKS WITH HIS FEET, THATS YAMAGAZI COMPILERS. CORK COMPUTERS IS THE SOUTH PACIFIC ISLAND EXHIBIT ON THE LEFT, PUT WATCH OUT FOR THEIR VOLCANO-IT'S DRIBBLING GOOP ALL OVER THEIR BROCHURES."

Have you seen anything offbeat or unusual about the computer industry? Send submissions to Communiqués, PC Magazine, One Park Avenue, New York, NY 10016. Contributors receive \$50 and a PC Magazine T-shirt. Sorry, but any unused entries cannot be acknowledged.

Winners for this issue: John Bacher (free power surge), Victoria Spender (ideal for computers), Paul Childs (mouse pores), Peter Kreutzer (Metro), Dr. Joseph Levine (laptops), Jim Murdock (five new publications), Phillip Butler (70% plus 40%), Hugh O'Neill (applicants not important), Jim Chamberlin (flying disk).



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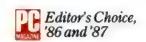
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COMPUTER BUYERS SURVIVAL GUIDE



You thought your job was tough. Well, it just got tougher. 1989 is shaping up as the most confusing year yet in the personal computer game.

If buying PCs were easy, everybody'd be doing it. Truth is, it's confusing to the point of scariness. The sources of confusion haven't changed: new software, faster hardware, and a battle royale over standards. In addition to classic AT architecture and the Micro Channel, we now have the prospect of EISA (Enhanced Industry Standard Architecture) machines. And fast 286 machines nearly equal the 386 boxes in performance.

In 1989 you'll have some real reasons to run OS/2. In fact, you already do. Borland's OS/2 version of *Paradox*, for instance, lets you implement true distributed processing and load sharing across a network. *Paradox*'s PAL language can start new threads on your machine or anywhere on the network. It isn't limited to *Paradox* tasks, either. It can start other OS/2 programs as well. PAL can also act as a load balancer, sending tasks to the least-busy machine. As Sun Microsystems says, the network *is* the computer—something to think seriously about in the coming year.

And while you're thinking about networking, think about how much the arguments have changed. Last year everyone was humphing about wiring standards, twisted-pair vs. coax, Token-Ring vs. everything else. 1989 will be a new ball game. Nothing's impossible in what will be the beginning of connectivity's golden age. PC managers are staring down yesterday's problems with the confidence that they can bridge anything to anything. We're a long way from a unified, plugand-play world, but there's hardly a problem without a workable solution.

APPLICATION APOPLEXY It astounds me that people still get their blood pressure up over standardizing on Lotus 1-2-3 and dBASE III. Of course, they're both perfectly adequate programs, and their long-awaited next versions will be significant advances, but they're also known quantities. Lotus and Ashton-Tate have been conducting their product development in public, as it were. Consequently, a host of other software products are waiting in the wings or already available that do as much as or more than the new versions of the market leaders.

Meanwhile, there's the mess in hardware standards. Last year, it looked as though Micro Channel and classic AT architecture would coexist for the foreseeable future. Now comes EISA, replete with the hidden message that the machines, if not the boards, you are buying today are obsolescent. It reminds me of something we heard from the folks at IBM

back when they introduced Micro Channel. How well did it work for them?

Speaking of Micro Channel architecture, I was the guy who thoroughly annoyed several manufacturers, including IBM, by hailing the then-new spec as a breakthrough that only needed some second sources to succeed.

So what did IBM do? Dragged its feet for a year or so, lashed out with its law-yers, alienated its dealers in a quest for market share, and watched in amazement as its share dropped precipitously. Then, wondrously, it reintroduced the AT bus. An obvious move to build consumer confidence.

And what of IBM's fabled Micro Channel technology partners, Dell and Tandy? Dell dropped its Micro Channel line for lack of consumer interest. Tandy first cited chip delays, then got a severe and uncharacteristic case of cold feet. Is Micro Channel something you should invest in? Sure, if your IBM salesman is holding your family as hostages.

COURSES OF ACTION In the coming year you can be high-profile, low-profile, or no-profile. The high-profile brand specifier will make sure that every machine that comes into the company is Presentation Manager-capable. That means, at minimum, a fast 286, preferably a 386, lots of memory, a 60MB or more hard disk, VGA, and a mouse. But wait, you cry. My users are banging out memos in WordPerfect 4.2 and half of them are still using 1-2-3, Release 1.1. Why do I need all that horsepower?



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Wall Street is gunning for the PC business with a vengeance that's amazing.

The no-profile manager will pay too much attention to the news, thereby ignoring the facts. One of the most newsworthy items is Wall Street's colossal lack of confidence in the PC industry. Wall Street is gunning for the PC business with a vengeance that's amazing. I guess they can't stand to see anyone else happy. I see a disturbing trend toward confusing a company's fiscal success with product quality. Sure, you don't want to buy a lot of product from a company that's about to go down the tubes, but how do you equate price/performance with price/earnings?

The financial community got burned by the computer industry back in 1984–85, when changing standards and overpromises caused deep dislocation and virtual paralysis in the mainframe and minicomputer markets.

PCs were tarred by the same brush, and also with the realization that the PC industry just could not continue to grow at 100 percent a year. The fallout drove some perfectly good (as well as some perfectly awful) computer companies out of business. It probably couldn't happen again today, when the replacement/upgrade market in the current installed base is bigger than the entire market in 1984.

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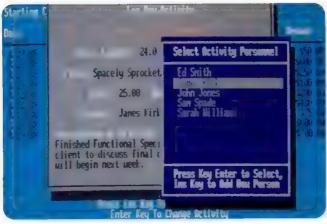
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THE AGONY OF NETWORKS



What does John C. Dvorak think about local area networks? Aside from their being the toys of control junkies and the enemies of the personal computer, not much.

Tew York Times ace technology reporter John Markoff called me recently and asked for a quote about local area networks: What do I think about them? Before I could answer he took another call, saying he'd phone me back. This gave me a chance to cheat and write down my thoughts.

I soon realized that I'm a bona fide complainer when it comes to computer networks. I scribbled one aphorism after another. Can it be that as *PC Magazine* turns to connectivity and the dreaded workgroup computing, I'll be the guy complaining the loudest? (What else is new?) As the last bulwark of single-user computing, here are my "quotables" that tell you exactly what I think about networks:

- In all large corporations there is a pervasive fear that someone, somewhere is having fun with a computer on company time. Networks help alleviate that fear.
- The only thing a network is good for is to poll the system in the morning to see which computers were stolen.
- They shouldn't be called networks, they should be called don't-works.
- Just as the personal computer enhances the efficiency and overall power of the individual, so too does the network enhance the efficiency and overall power of the MIS department.
- The network is the last-ditch attempt to turn powerful standalone computers into dumb terminals.
- A network is the world's most expensive method for file exchange.
- In this day and age of inexpensive hard disks and cheap printers, there is no ratio-

nale for using a network except for gruntwork invoicing and billing that would be better done on a multiuser system.

- When people talk about centralized data, I think mainframe, not network.
- A network is an idea that would only appeal to a control junkie.
- Network today, diskless workstation tomorrow, dumb terminal the next.
- Networks introduce new forms of computer sabotage into the corporate environment. A rank amateur can trash a network, read confidential memos, and create general havoc, undetected.
- The network is an idea whose time has come—and gone!
- Now I see they have a trade show for networks. Do we need a trade show for networks any more than we need a trade show for word processing software?
- Networks are hot for one reason: there is a ton of money to be made selling networks to people who don't need them but

The state of the s

can be convinced that they do need them.

- I'm amused by the number of magazines that specialize in connectivity and networks. As far as I'm concerned, once you're connected to a network you don't need a magazine.
- Who makes the most money from the network business? The guys who make expensive cables, that's who. Now *there's* a business.
- What's the advantage of a network over a multiuser system? There isn't one, but all the confusion and the ability to mix and match parts is a bonanza for consultants.
- Find a network consultant and you've found someone who knows how to make money without doing any real work. Note: they always have a firm handshake.
- Definition of the impossible: finding the consultant who sold you the network when it goes down for good.
- The only six words a network service technician knows: Did you check the "T" connector?
- Sun Microsystems and Digital Equipment like to say "the network is the computer." No it's not!
- The catchphrase "the network is the computer" is a dubious rewrite of Marshall McLuhan's catchphrase "the medium is the message." To network types this is real creativity.
- Both the network and the diskless workstation are the enemies of the personal computer.
- "Connectivity" is the right word for all this. Especially if you emphasize the "Con."

And . . . you can quote me!

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INSIDE TRACK

Borland to use new marketing tactic—insults.

I was amused to read that Borland International wants to show better earnings, and one way it hopes to do this is to get more free publicity. In the meantime, the ad budget will be sliced down to something less aggressive. To me, this means the grand experiment-low-price software for everyman-is dead. The public still associates higher prices with quality and the low numbers on the Borland balance sheet (when compared with the Lotus, Ashton-Tate, and Microsoft numbers) prove it.

This means the last loudmouthed bastion of low-price software will be Adam Osborne and his Paperback Software Corp. in Berkeley. Philippe Kahn of Borland will have to change his spiel to get the attention he once had by extolling low prices and aggressive mail order.

So, what's Kahn going to do in order to get media attention? I don't know what he has in mind, but already I see signs of a bad start—one that might backfire and hurt Borland. Let's call it Spiro Agnew marketing: attack the press. My first observation of this new tactic showed itself in the Sacramento Users Group magazine, Sacra Blue, which reported extensively on a speech Kahn made to the group. The approach worsened and in the August 1988 issue of Blue Notes (from the San Francisco IBM PC Users Group) Kahn lashed out at the press, blaming it for everything wrong with the business. Some quotes:

On reviews: "Who believes that a review in the press is credible?"

On analysis: "... we figured the press didn't know what it was looking at

On computer magazines: "Users group newsletters are usually much better."

He went on to blame the press for not

moaning about look-and-feel suits, although most observers had complained bitterly. He says reviewers mostly use the press kits to write their reviews and then he ridiculed them for quoting the misinformation in the kits. He said that marketing people influence the press unduly because the press "doesn't use software." He ridiculed the notions of "brand specifiers" and "volume buyers" and ripped into PC Week gossip columnist Spencer Katt.

Kahn excused himself for advertising in PC Week, saying he only advertises there because IBM employees read it-a remark that still has me confused. And he went on and on. In short, he did everything possible to insult the press in some hope of gaining its favor and attention during a cutback in advertising.

The logic behind his approach eludes me. The press has some affinity for masochism, but this is ridiculous. In fact, as far as the daily press goes, Kahn's putting himself in a position where he may never again be contacted for a quote or an opinion except in an article entitled "What Happened to Borland?" Insults do little good in the battle for publicity. It's possible that Kahn, a Frenchman, doesn't really understand what can happen to him if he continues using this tactic with the media. Borland is too large for this kind of nonsense. It's particularly annoying when the American press gave him millions of dollars' worth of free publicity.

Meanwhile, Kahn is avoiding the real issue, which is, What's happening to cheap software?

More News About the Chang Modification Dept.: As many readers know there was a big hubbub about the peculiar speed-up fix done in Taiwan to make the 286 chip run at what appeared to be

40-100 MHz. I'm going to Taiwan as I write this to find out what Chang did (if I can find him). Meanwhile, a number of hardware wizards perhaps pieced together the puzzle and discovered that a modification can be made on the timer of a 286-based machine that foils most benchmark programs. That's an interesting approach to performance—design to baffle the benchmark tests. In Chicago I was shown a machine modified by the boys at Zeos International, up-andcoming cloners from St. Paul, Minnesota. Using their version of the Chang modification, they made an 80286 look as if it were running near 100 MHz.

If nothing else, the Chang modification will make benchmark-test designers more careful about how they design their software. Everything works out for the

While in Chicago I talked to Art Lazere, the blustery boss at Northgate Computer Systems who, along with Mona Hendrickson, showed off still another version of the Omni Key keyboard replacement. For anyone interested: the Omni Key/102 (from Northgate Computer Systems of Plymouth, Minnesota) is the keyboard I use! The next fancy keyboard is worth a look too. Excellent product. What I like about Northgate is that instead of copying exactly what IBM does, it determines what users really want from a keyboard. Hmmmm, there's a new concept. I wonder what would happen if IBM did that?

Good Idea of the Month Dept.: An idea whose time has come. Ever since the 51/4-inch disk was format standardized I've wondered why the disk testing machines don't simply format the disks while testing them. Finally! 3M is beginning to sell preformatted diskettes. I expect that the price won't be much higher than normal diskettes. All disks should be sold this way because as densities increase, the time it takes to format a disk gets harder to endure.

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NETWORK MYTHOLOGY



Myths about LANs abound in the network marketplace. These "LAN Lies" are doing real harm; lost time and wasted money are the results of decisions based on bad information.

etworking may be "where it's at" in PCs today. Unfortunately, too often it's also where a lot of horse-feathers and bushwa are at.

I just came oack from a conference on local area networks. One night during the conference, a group of us—corporate PC buyers, LAN specifiers, and LAN installers—gathered for a few drinks and for what turned into a verrity late-night session on what one participant called "LAN Lies."

The talk in that room was sometimes angry, often hilarious. Everyone had war stories about other people's misrepresentations and gaffes, and some of us even told about our own expensive mistakes and screw-ups. What came out of the talk was a sense that confusion and mythology about LANs are still rampant, even among some of the high-level people involved in buying, planning, and implementing networks.

One of the issues we spent a long time hashing out was the idea of LAN costs, both before and after installation. We agreed that beyond such universal problems as overpromising and underdelivering on the speed, number of users, and other performance parameters of LANs-to-be, the biggest single myth in LAN planning is that the wiring medium you choose is the biggest determinant of system cost.

I've been fighting this one for years with my corporate clients. Actually, it breaks down into two separate problems: "All That Wire in the Walls" and "Coax Costs a Bundle." ALL WIRED UP? I can't count how many times I've been assured by a new client that this network won't cost too much to install, nor take a lot of time to bring up, "because we're going to use all that unused phone wiring in the walls." This problem, of course, has gotten even worse now that we have products that deliver respectable performance on twisted-pair—installers' talk for standard telephone wiring.

One of the great half-myths of American business is that the walls of U.S. office buildings are absolutely filled with unused wire-pairs, all of which are neatly terminated and marked as to routing and destination in the "telephone closet" somewhere on the premises. It's a half-myth because there is a lot of unused telephone wiring in those walls—usually "pulled" by people installing phones for previous tenants, then abandoned when succeeding tenants' installers couldn't figure out



where in the world anything went.

Just as you'd imagine, while it may eventually be possible to trace where some of that wiring runs and thus use it to support all or part of a network, doing so would cost a fortune—far more than pulling new wire—because of the enormous amount of time it would take to track down those unused, unterminated, undocumented wire pairs.

That leads directly to the second problem: the idea that cost variations among different kinds of LAN media are major determinants of the final cost of putting in the network. Nonsense.

Twisted-pair cable costs less than \$1 a foot. Coax cable costs about \$1.25-\$1.50 a foot. And even fiber optics—I can just hear some readers going "Woo-woo, this is the big one!"—only runs in the neighborhood of \$1.75 a foot.

Excuse me, but though the range is wide, no matter which cabling medium you choose, the variation from one of those figures to the next isn't going to make a huge difference in the total cost of the installed network. Why? Simply because the overriding principle of LAN media cost is that it isn't the cable that costs. It's the guy who's making \$35 an hour or more for pulling the wire through the walls who runs up the tab.

Funny? Sure. And true. On a typical LAN installation, wire-pulling labor costs far exceed the cost of the cable itself. In fact, the cost of the cable is several notches down the list, certainly below installation labor and network adapter cards for the PCs going on the net.

JIM SEYMOUR

VICTIMS OF MYTHINFORMATION

When we believe these unfortunate myths, we get trapped into the wrong kind of network-planning decisions because we're asking the wrong questions. This happens to people who get trapped in those nearly doctrinal arguments over network configurations and protocols, too: "You've got to use a ring, not a star," or "No one uses a bus configuration anymore," or "Ethernet is the only way to go." They fool themselves and waste time and money on answers that may be perfectly correct and at the same time perfectly useless—because they came in response to the wrong questions.

Similarly, those who confuse the cost of cabling with the real cost of a network throw away months of time and small fortunes through suboptimal decisions based on bad information.

You may be either reassured or scared to death by the fact that even the experts sometimes still succumb to these myths and misconceptions. Certainly there was a lot of near-doctrinal disagreement in that

■ Serious networking is still new enough that we shouldn't be surprised by the hype and hustle of the LAN market, nor by how tenaciously some of these LAN lies hold on.

LAN lies hold on.

room that night, with the Token-Ring forces battling the StarLAN people, the Novell people yelling at the 3Com champions.

HOW TO FIGHT THE HYPE If there was any single point all of us in that room agreed upon, it was that we have all spent far too much time trying to talk colleagues, clients, and customers out of things they knew they "knew," but which we knew to be fallacious and in any case wildly irrelevant

Serious networking is still new enough that we shouldn't be surprised by the hype and hustle of the LAN market, nor by how tenaciously some of these LAN myths and lies hold on. But we've got to stop falling victim to them. Asking the right questions—and demanding (and listening to) the right answers—would be a good start.

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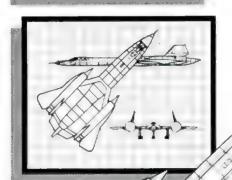
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The results of our first annual "What to Do with Your Obsolescent Equipment" competition are now in, and we're impressed with just how resourceful you computer wizards can be. Entries from the four corners of the globe stuffed our electronic mailbox to overflowing.

To those fine entrants who didn't win, our apologies. To those who sent in the many duplicate and obvious responses, our condolences: next time, try harder. Many, many of you suggested such tired old solutions as foisting old clunkers on a secretary, child, or spouse who may previously have benefited from a hand-medown Commodore 64. Dozens recommended simply donating moribund machines to charity or in-laws. But for every unimaginative entry, there were dozens of unique, stylish ideas.

LITERARY FLAIR In the printer division, Ms. N. Allium of Vidalia, Georgia, takes the palm for her complete makeover of her moribund daisy-wheeler. Simply by removing the case and taping down the safety interlock, this creative soul transmogrified a useless behemoth into an efficient white-noise generator capable of drowning the noise of jackhammers during the recent construction of new offices outside her window; a mere flip of the self-test switch, and the sound machine blazes into action. Wasting nothing, Ms. A. also transformed the case into a solid base for the terrarium she created in the clear plastic sound-muffling cover that formerly graced the printer stand. The print wheels themselves are now tasteful and functional earrings with a distinctly literary flair.

First prize in the communications division goes to Mr. Earl Speedo, "out on Route 66," for his ingenious recycling of ancient 300-bit-per-second modems. Mr. Speedo simply mounts one of the sluggish devices in plain view on the dashboard of his BMW 735i, where the high-tech case and blinking LEDs are invariably mistaken for a radar detector. Any computer-illiterate thief in pursuit of this "Smokey Smasher" is in for a big surprise after he or she smashes the windshield and tries to peddle the ill-gotten gains. Mr. Speedo writes that he has already used three modems in this "detector protector" scheme and figures the three he has left will serve him for at least a month or two, when the 1,200-bps models he's currently using will have outlived their usefulness.

In the expendables division, "All the Gang" from Allenwood, Pennsylvania,



wins easily with its photo of a special "Merry Computermas" display. Built solely of spent laser printer cartridges, garlanded with chains of tractor-paper sprocket edges, and gaily festooned with bad-sectored floppy disks, this unusual "tree" is a sobering holiday statement about making do under adverse conditions.

LOVE COASTER The monitor division's clear victor is Mr. Alan "Squinty" Orbison of East Liverpool, Ohio. After carefully using special laboratory equipment-don't try this at home!--to remove the phosphors from the screen of his ancient CGA display, Mr. O. filled the vacuum tube with water, a dollhouse-size computer, and a school of piranhas, to create 'a tranquil but pointed reminder of the speed of technological change."

Mr. Orbison also wins first prize in the adapter division for his creative reuse of an old full-length CGA card as a high-tech "love coaster" that will hold two drinks at once for those romantic occasions. "Sand the back smooth first," recommends the licentious mixologist, "or you run the risk of scratching your credenza."

Ms. Landon Bridge of Tacoma, Washington, wins both first and second prize in the documentation category. In her second-place entry, she suggests that outdated software manuals make excellent kindling for log fires. In her first-place entry, she suggests that new software manuals make excellent kindling for log fires. Ms. Bridge notes that she's glad that the competition did not specify "used" equipment, since she "suspects no manuals have ever actu-

STEPHEN MANES

ally been used." Clever, Ms. Bridge, but your entry was past the deadline for our computer humor contest.

The PCir division attracted many entries, including at least three dishonorably mentionable litter boxes for cats. However, the judges gave the nod to a Mr. J. Sculley of Cupertino, California, who turned his orphan IBM into a combination stand that can simultaneously hold a can of Diet Pepsi, an issue of Forbes, a tiny trash can, and an Apple Macintosh computer. A patent for this invention, he notes, has been applied for, so infringers beware.

Old 8088 machines never die; they just help with breakfast. Mr. Sinclair Bumbershoot of Scunthorpe, England, offered the most creative use by far. When emptied of their electronic components, the five expansion slots perform a perfect job as a toast-cooling rack for a four-slice toaster-a feat that no current PS/2 desktop model will ever be able to match.

With thousands of programs threatening to employ the F12 and SysReq keys any day now, old-style PC and AT keyboards are rapidly falling out of fashion. Solution? Some tin-snips and surgical tools helped orthopedist Irving Snoll of Chicago transform the input devices into Dr. Snoll's Exercise Sandals. The variable key positions conform to the natural shape of the human sole, and the weight of the all-metal devices eliminates the need for ankle weights. Similarly modified PCir keyboards will do the trick for toddlers.

One correspondent recommended a sneaky "software recycling" program: simply install an old version of DOS on the disk of your worst enemy. But Mrs. Meyer Jacoby of Ossining, New York, won first prize with her novel use for original distribution disks. Her 51/4-inch "DiskDeck" includes a full complement of 52 cards plus two jokers; the 31/2-inch edition is available only as a pinochle deck because: of the greater scarcity of its components. "If they'd only stop making the little ones in different colors," she reports, "it sure would make things easier."

As promised, each of our first-place winners will receive a fine original-model 8088 IBM PC clone with 64K and two single-sided floppy disk drives. Runners-up get collector's-item official IBM fulllength PC memory add-on cards, maxed out with now-scarce 16K chips to a full complement of 128K.

If you didn't win this year, put on your thinking cap. This time next year, you may be amazed at how you feel about your frustrating equipment—that crawly 6-MHz: 286 machine, that sluggish 16-MHz 386, or that too-tiny 80MB hard disk. The next wave of computer recycling is about too break, and it roars "OS/2."

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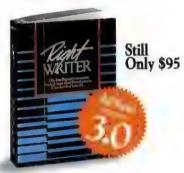
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If there was a computer cook-off, the competition would have it rough. They'd find it difficult to duplicate the armadillo aptitude for craftsmanship. "But then," quips T.W., "it's like what my father, of D.P., used to say, 'If you can't take the heat-you shouldn't be in the kitchen."



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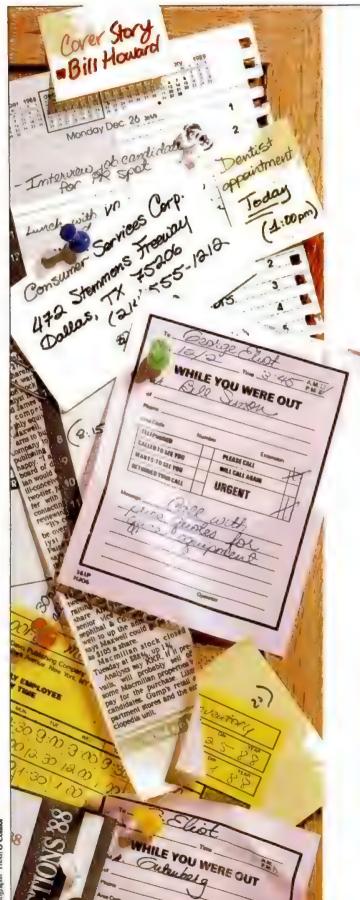
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CLASSIFIED INTELLIGENCE

o far, it's been the Lotus-led term personal information manager that people have applied to a group of about twodozen-plus products

still in search of a suitable rubric. Since many of these products are more different than alike, it's hard to find a general description that covers them all. Hence it seems only fair that a coinage so closely identified with Lotus has come into widespread use: after all, it was the promise of a revolutionary product from Lotus that propelled this somewhat sleepy software category from the realm of "nice program, for somebody in the company" to "belongs on everyone's desk."

What is a personal information manager? It's a program that hopes to do for words what spreadsheets and databases have done for numbers: allow users to enter, retrieve, analyze, and cross-reference data-first numbers, and now words-at will.

In the context of a business setting, there's corporate information and personal information. Corporate information includes sales data, employee salary records, and customer mailing lists: repetitive data with a stable data structure. Corporate information, primarily num-

PFRS()

bers, is the stuff of traditional databases on mainframes, minicomputers, and now personal computers.

Personal information comprises the random pieces of information you come across every day: notes you scribble on the back of business cards, phone-message slips, plans for how you'll conduct a talk or sales pitch, management issues, your personal Rolodex, just about anything written on a Post-it, or the annotations you make on a business document.

Anything you empty out of your purse or suitcoat pockets at night that has writing on it probably constitutes personal information.

Personal information doesn't fit into rigid formats as easily as does corporate information, and it's more likely to consist of words rather than numbers, or at most a mix of words and numbers. The information is of value to your company indirectly because-properly organ-

ized-it's of extreme value to you, and you're valuable to your company. Products that bring some semblance of order to this tangled web are called, logically, per-

sonal information managers.

A new category of software lets you structure the random bits of personal information you come across every day into an intelligent compilation that mirrors the way you work.



PERSONAL INFORMATION MANAGERS

You may have a personal information manager in your PC already and not even know it. Without stretching the definition too far, the term can be considered to touch on all these product categories:

- appointment calendars, time managers, and time trackers;
- text-based databases (sometimes called textbases) or text-retrieval software;
- outliners;
- hypermedia or hypertext;
- pop-up notepads, typically found in desktop organizers (along with calendars and phone dialers);
- contact or client management software;
- standalone phone dialers;
- document or file managers;
- electronic mail:
- annotation, redlining, or group-comment software.

A BIG UMBRELLA Most of these categories have been around for years; jointly they include dozens and dozens of programs. Even hypertext has been around for years—since the 1960s as a concept, waiting two decades for hardware to catch up with man's fertile imagination. (Apple's HyperCard for the Macintosh, which isn't a card at all but a piece of software, is a bit too limited to be considered true hypertext. It does fit nicely under the broader personal information manager umbrella, though.)

Older programs, especially desktop organizers such as Borland's SideKick or Lotus's Metro, do a respectable job of getting personal information into your PC. The newer breed of programs goes further and helps you pull out the data in an orderly fashion. The best programs show relationships you might not have noticed without their assistance. Used properly, they can be support tools for your decision making.

Much of the interest in personal information managers stems from an ambitious trio of products announced within the past year and shipped in the past few months: GrandView, IZE, and Agenda. All have been tabbed "personal information managers," and while each contains attributes found in the other two, they are clearly not direct substitutes for one another.

GrandView, which sells for \$295 from Symantec Corp., might be broadly defined as the most highly evolved outline proces-

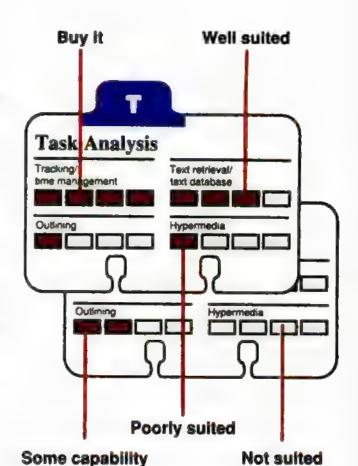
PC

Suitability to Task

C hoosing the perfect personal information manager from a group of products that are more dissimilar than alike is no easy task. The unfortunate truth is that each personal information manager has a certain degree of success at fulfulling its mission in life, but that mission may be very different from yours.

Recognizing that these programs agree to disagree, we've divided this product category into four subgroups that encompass a wide range of functionality: tracking/time management, text retrieval/text databases, outlining, and hypermedia. Some products exhibit capabilities in all subcategories; others specialize in only one of the four.

PC Magazine required all reviewers to give a suitability-to-task rating based on their assessment of a program's performance in each of these subcategories, asking them to bear in mind how feature-rich a program is, how well it uses the features it has, and how easy it is to learn. Although logic might suggest that a product that scores high on all counts comes closest to being the ideal personal information manager, for some users a product that earns a high score in only one subcategory will be the most appropriate. And for products that cut across all four subcategories, the quality



and intelligence of the interface may be the feature that counts the most.

These subjective ratings, based on a scale of 0 to 4, are presented in separate indexes that accompany each review. The ratings translate as follows: 0—not suited; 1—poorly suited; 2—some capability; 3—well suited; 4—buy it.

sor on the market today.

IZE, \$445 from Persoft, manages, dynamically links (that is, switches among), and retrieves documents from multiple files and file formats. The IZE dynamic links represent a partial attempt at hypertext. Among existing personal information manager metaphors, IZE fits best into the text-retrieval category.

From the moment it was announced at the computer industry's annual Fall Comdex trade show in November 1987, Agenda, \$395 from Lotus Development Corp., had a certain mystique. Chalk it up to Agenda's paternity papers: the program was hatched by Lotus founder and former chairman Mitch Kapor, former Lotus chief of technology Jerry Kaplan, and director of R&D Edward Belove—three of the industry's brightest lights. Agenda defies typecasting; it has elements of time man-

agement, text retrieval, hypertext, and a bit of outlining. Compared with *IZE*, *Agenda* is more painstaking and labor-intensive for the user, but it's a bit more thorough and accurate in its matching and grouping.

Other information management products appeared within the past year, including Group L Corp.'s Memory Lane, Microlytics' GOfer, Valor Software Corp.'s Info-XL, Polaris Software's PackRat, and Roykore Software's Opus 1. That makes personal information management a category about to take off. Or so its backers hope.

A not-yet-released Lotus product, *Notes*, stands on the periphery of the personal information manager concept. *Notes* contains elements of a free-form database, electronic mail, and workgroup comment features. However, there's just enough

OUR REVIEWERS

Bruce Brown is a principal of Soft Industries, a microcomputer consultancy based in Southington, Connecticut.

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M. David Stone is a contributing editor of PC Magazine.

Priscilla Tate-Austin is a senior editor of PC Magazine.

similarity of concept with Agenda to invite comparison. As Lotus R&D head Belove describes the two, both offer flexibility and the ability to recatalog information on the fly, but Notes is optimized for information sharing while Agenda will remain a singleuser product. Notes requires the Presentation Manager (OS/2 1.1) graphical user interface and a file server; Agenda is a standalone, character-based DOS product with an OS/2 1.0 version en route. Over time, though, the two technologies might evolve into one, says Belove.

BACK TO THE FUTURE While hypertext only now is evolving as a real-world application, its origins date back to the end of World War II. Writing in the Atlantic Monthly in 1945, Vannevar Bush envisioned an electronic desk, Memex, with access to near-infinite amounts of information and the ability to find any piece of information, then jump to another piece, virtually instantaneously. Ted Nelson coined the term hypertext in 1965, and in 1968 Douglas Engelbart showed a graphical workstation that moved effortlessly both among related documents and within the levels of individual documents. Until the past year or two, hypertext has remained more a laboratory ideal than a real product because the cost and processing power that it required weren't available to individual users.

With hypertext, information is broken into discrete components. A single file would have many components, or nodes, linked by common words or phrases to other files.

Depending on your point of view, the ability to have all related information linked is either a blessing or a curse. To proponents, hypertext promises to be a revolutionary research, analysis, and thinking tool; to critics, it's an unstructured time-waster that leads the user down ten blind alleys for every useful link. Hypertext programs for the PC include Owl International's Guide and Roykore Software's Opus I; the latter is a "hyperdrawing" program.

REVIEW PROCEDURE Because the field of personal information managers is so broad, PC Magazine set aside (for this story only) the usually tightly scripted review procedures, benchmark tests, and commonly asked features-table questions that judge products by a single, uniform set of standards.

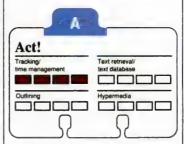
Instead, we selected four applications, or tasks, that personal information managers might reasonably be expected to perform, and we judged products on how well they fit in. These are:

- time management, tracking, or appointment calendar;
- text retrieval or a text-based database;
- outlining:
- hypermedia.

Each task was rated on a scale from 0 (no abilities, completly unsuited) to 4 (offers all or most desirable features). Some products offer abilities across all four applications.

As with all other software reviews, the

products were tested for ease of use, ease of learning, robustness, support, and quality of the manuals and on-line help. The 25 reviews are arranged in alphabetical order by the product's name. - Bill Howard



If you spend a good part of your day following up sales leads or setting up appointments with clients, you should look at Act! from Conductor Software. A wellconceived and tightly integrated product that includes such helpful features as a phone dialer and customizable pop-up menus, the \$395 resource-tracking program is designed to help you manage your contacts, time, and expenses.

Essentially, Act! maintains a database of your dealings with your contacts. Its basic unit of information, called a profile, can represent a client, customer, or sales lead. Each profile is described in two screens of information, which contain 96 fields: 15 of those are user definable. Standard profile data includes name, address, telephone, salutation, contact, task, and follow-up information. Recognizing that the more contacts you have the easier it is to lose track of your correspondence with them, Act! maintains a history of all interactions with each contact. For example, the program's phone dialer logs all calls made to a particular contact. In addition, Act! includes an expense log, a limited word processor for memos and correspondence, a form-letter function, and a pop-up calculator.

To help you get started, Conductor Software furnishes sample Act! files and prudently suggests that you work with them before you begin to enter real data. The manual that comes with the program is clearly written but would benefit from more screen shots of program menus. And

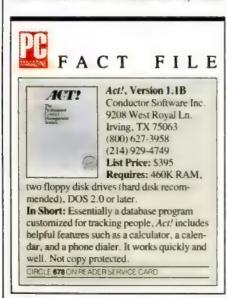
■ PERSONAL INFORMATION MANAGERS



Act! uses customizable pop-up windows that aid in entering frequently used information.

if these study aids aren't enough, the vendor offers a \$10 VHS-format videocassette that will walk you through the major features of the program in about 25 minutes. Buying the video makes the most sense for sales departments—Act!'s prime audience—which could use it as part of a sales training course for new employees.

THE OPENING ACT The program has a horizontal moving-bar menu structure; customizable pop-up menus help you fill in fields. You spend most of your time in the Action menu, through which you can control most of the program's major functions, as well as edit and add profiles. The Action menu has a Write selection, which



activates a word processor. The Write selection lets you write memos and correspondence, and also has a form-letter function if you need to do a large mailing.

By offering preset and customizable menus for common data-entry chores and by letting you enter dates by pointing to a calendar, Act! saves you time at the keyboard. Once you've entered records (profiles), you can search for them individually or in groups by looking for matches from one or any combination of fields.

Act!'s phone dialer is intended for voice communications only. It lets you preset local, long-distance, and special dialing sequences, saving you even more data-entry time. Its history feature, an important attribute, lets you quickly record the results and required actions for both outgoing and incoming telephone calls.

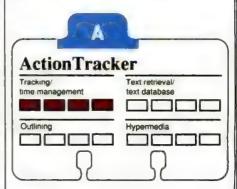
Also impressive is Act!'s ability to create a week-at-a-glance-style calendar with separate columns for calls, meetings, and to-do's. Information for the calendar is taken directly from entries on the profile screens.

Act!'s other major menus include Library, Expense, Settings, Database, and Utility. In the Library menu, any information not attached to a specific profile can be saved, such as price lists or procedures. Act!'s Expense menu is an annotated business-expense tracker that lets you set such items as mileage and hourly rates and choose an expense payment method. A slight drawback here is that rates are set for the entire file, not the client, and they ap-

ply to all future expenses unless they are reset.

The Settings menu lets you customize the way the program works and appears; here's where you define the field labels for the user-defined fields. The Database menu controls importing and exporting delimited, fixed-length, or Act! format files. The Utility menu includes selections for rearranging and compressing files.

THE FINAL ACT Act! is best suited for users like sales professionals and fundraisers whose work revolves around contacting many people. Although the literature that accompanies the program suggests other uses, such as logging real estate that you want to purchase, using Act! for applications other than tracking people would dilute its major strength—automating a contact or sales network. If that's your primary need, Act! should serve you well.—Bruce Brown



Information Research Corp. characterizes ActionTracker, its \$198 task management program, as "multiproject control made simple." That description falls close to the mark. Designed more for following and integrating activities related to many small projects than for single huge ventures, the program creates a flexible database of events that can be accessed, viewed, and analyzed in a variety of ways.

You don't have to be an expert project manager to use *ActionTracker*. In fact, its deadline/appointment orientar on makes it better suited to managers and professionals than to those schooled in project management methodology.

The best way to get acquainted with ActionTracker is to install its sample data and follow the tutorials. After working with



ActionTracker's date options can be coordinated with an action list entry, if requested. The violet field at the bottom warns of weekend scheduling.

the sample data for a short amount of time, you'll find the instructions in *Action-Tracker*'s manual more meaningful.

AN INTELLIGENT CONSISTENCY

ActionTracker's screens don't throw you any curveballs. Options are displayed on menu bars at the bottom of the screen or in windows that pop up as needed. Function keys control most actions and are used consistently thoughout the program. Should you get lost, context-sensitive help is always available.

ActionTracker's data-entry screens are well designed and attractive, saving you time by focusing on the task at hand rather than on superfluous details. For example, on the action-list screen, date and budget overlays are kept out of sight until you need to see them.

The program offers other timesaving features. An Enter Previous option pops in the value previously typed into the same field. Templates are available for entering often-used actions, as are reminder fields that automatically insert up to four copies of an action into appropriate daily calendars. A beep and a message warn you that you may have mistakenly placed reminders on weekends and holidays, but you can still assign reminders to those days if you need them.

FREEDOM OF CHOICE Action-Tracker's flexible entry options allow you to tailor the system to your own work habits. For example, you may prefer to create a list of steps in a project and assign dates or personnel to them later. You may budget time or money or both. You may create miscellaneous actions that remain unassigned indefinitely. You may change dates through either action lists or calendars. Experienced users can customize screen colors or trade a degree of data security for faster file updates. In fact, not only does the program not try to force your application to bend under its rule, but Action-Tracker's documentation strongly encourages you to reinterpret the program's basic structures.

ActionTracker puts information into five data files called projects, project sources, actions, types, and resources. These terms can be defined broadly. For example, in an application for professional groups, the sources might be the clients and the projects might be the individual assignments. In an application for portfolio managers, the sources might be categories of investments and the projects might be individual instruments. Each project may have up to 100 actions, but there is no limit to the number of projects, sources, resources, or types that the program can handle. In addition, the program lets you cross-reference files, allowing a wide variety of data views.

Also adding to the program's flexibility are 14 built-in reports, which include action lists across project lines categorized by type, source, department, manager, or responsible person. You can vary the selection criteria for these reports by using



ActionTracker's filter options. For example, you might create a report with or without budget summaries, including or excluding completed items, and focusing on a particular time frame.

EXTENDING THE POSSIBILITIES

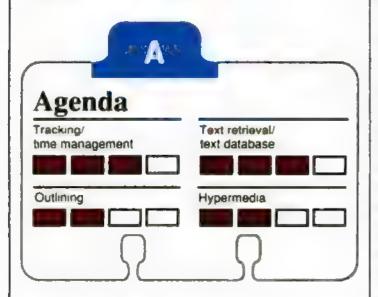
But you don't have to settle just for customized reports. If you purchase Action-Tracker with PQL, which stands for Program Query Language, you open up additional output possibilities. With PQL, you can create graphs and histograms, do custom formatting, use complex data-selection criteria, and perform ascending and descending sorts as well as other powerful arithmetic functions. This version of the program costs \$248.

All fields in an ActionTracker database are accessible through PQL. You can select, compare, total, average, export, and otherwise manipulate them to suit your purposes. PQL accepts both menu-selected and command-line instructions. You can save reports created either way. If you have even a rudimentary understanding of database concepts, you can multiply the power of the program many times over by using PQL.

■ PERSONAL INFORMATION MANAGERS

NOTHING'S PERFECT For all its power and flexibility, ActionTracker lacks a few features that might make it more user-friendly and a better personal assistant. For example, it would be helpful if the program warned you when appointments overlapped or if it automatically restricted certain dates. Then, too, it would be nice if there were an automatic way to create phone or address lists; to do so now means creating your own PQL procedures. According to Information Research, an enhanced version of ActionTracker, which will be available before the end of the year, will include such new features as Gantt charts and extensive note-taking capabilities.

Of course, the best way to judge ActionTracker's power and ease of use is by using the program. Why not, then, take Information Research up on its 30-day evaluation-period offer and try the program yourself?—Joy Segall



A genda, the most talked about of the personal information managers reviewed here, may be the most powerful and most frustrating as well. Agenda evolved from the personal vision of Lotus 1-2-3 developer Mitch Kapor and two other leading lights of Lotus.

What's genius to one person may be insanity to another, however: you'll find this \$395 program either brilliant or quirky. Possibly both. I did. After using Agenda for 11 months in its alpha, beta, and retail versions, I'm impressed by all that Agenda can accomplish—and still at a loss for a snappy one-sentence definition of what Agenda is. The best definition may be more of an explanation of how you use the program.

Take every useful scrap of information

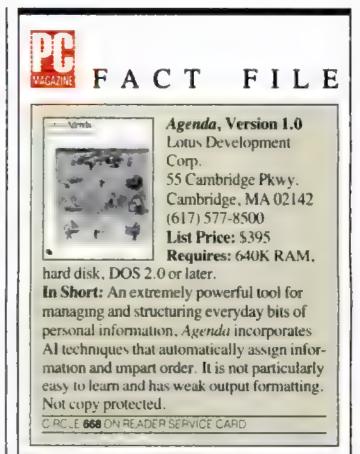
you get in the next 24 hours (your to-do list, two useful suggestions you got from your coworkers, the name of a widget vendor gleaned from a seatmate on the Eastern shuttle, an idea you saw in the Wall Street Journal), and type it into Agenda.

Do that for two weeks or a month and build up a solid body of ideas. Then chop, slice, dice, filter, and view the information. You'll manually create some of the assignments and views; Agenda will help complete others. The more you use the program, the more it can automatically complete your thoughts and assign information. The information, plus the relationships, juxtapositions, and dependencies you uncover, and the orderliness you gain—that's Agenda.

THREE NEW CONCEPTS Even if your PC experience includes years with a word processor, a spreadsheet, a database, and a desktop organizer, *Agenda*'s concepts may require you to undergo a bit of acclimation. *Agenda* has three conceptual building blocks. They are

- Item: a single nugget of information, usually a phrase or two, such as "Meet Cogswell Ltd. marketing manager for drinks next Friday at Bennigan's." The item is your information entry. An item can be 350 characters long, with additional text spilling over to a 10K-byte note attached to each item. The entire Agenda database can be 4MB, although once your database exceeds 100K you'll probably want to use a 386 or a very fast 286.
- information. Items are assigned to categories. At first, you assign items manually. As you build structure into your database, Agenda can evaluate the items and assign them to categories automatically. Agenda categories are very rough equivalents of fields in traditional databases.
- View: the way you look at information. A view is an on-screen report of your information, filtered and sorted to your liking. The view is divided into sections. Views might be sectioned (or grouped) by sales region, by competitor, by date, by priority, or by the order you entered the items. Agenda can have as many views as you can think to create.

The view on-screen can be arranged in several columns. Items are always



grouped into one column; additional columns generally show information from the categories that aren't grouped into sections. Confused? Welcome to Agenda.

Here's an example: Your database view is sectioned (or sorted or grouped) by the companies you sell to. All the items about Cogswell Ltd. are in one section; the items about Burnstead PLC are in another section, and so forth, with one company per section. Additional columns might show the priority you attach to each item, the date you entered the information, and the names of your contacts at the companies.

ASSIGNING AND FILTERING Agenda's 2½-year gestation period yielded an abundance of assigning and filtering tools.

If an item contains (or doesn't contain) certain information, it will be assigned (or unassigned) to certain categories. Lotus calls this "conditions" and "actions." Also, you can filter, or restrict, views to show only certain categories, or only items falling between a range of dates.

You can establish category hierarchies. For instance, you might have a Priority category with three children: high, medium, and low. Categories and their children can be exclusive, if desired.

You can use synonyms to describe the same thing. "Jeff," "JB," "Larry's successor" and "District 12" could be used interchangeably with "Jeff Bond." Agenda would recognize all five.



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Shares printers in background	Yes	No	No
Dual window interface	Yes	Yes	Yes
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PERSONAL INFORMATION MANAGERS



Agenda allows you to enter information and then add structure as you go along. Initially you make the category assignments; then, as Agenda learns your style, it takes over the categorization. Shown here, a filtered view of a sample PC Magazine story database. divided into product topic categories.

Agenda's most important feature is item parsing. Using artificial intelligence techniques, Agenda skims an item for information that can be used to match items to categories, without your intervention. Agenda understands conversational dates (next Wednesday, beginning of May) and the implications of your conditions, actions, and filters. You can give Agenda three degrees of freedom in matchmaking (complete, some, a little) or turn this capability off completely, for instance, so it wouldn't misunderstand "When she plunged from the gangplank, that was the end of April" as 4/30/89. Artificial intelligence, as it is implemented here, remains a bit artificial.

Learning to use all the tools at your disposal competently takes time—a long time. It can take such a long time that some users may give up in frustration. And that's a danger, because Agenda becomes more valuable as the size of the database grows. You might give up just before you found the light at the end of the tunnel.

Agenda also shoots itself in the foot because it's a complicated program without the right training tools. Agenda includes two adequate manuals. On-line help is skimpy, there's no keyboard template, and some of the procedures (setting up conditions and actions) are downright confusing. Persoft's IZE, in comparison, steps users through its equivalent sequences in a way that makes the users more certain that what they intend is what IZE actually does. At its July rollout, Lotus said that 12 books

on Agenda were on the way; one may bail you (and Lotus) out.

TOUGH IT OUT If you stick with *Agenda* through the learning curve, you will be amazed at the order it brings to bear on your information. *Agenda*'s breadth of categorizing, matching, and viewing (reporting) powers has few, if any, peers among personal information managers.

On the four suitability-to-task groups used to rate these programs by *PC Magazine*, *Agenda* shows capabilities in each area.

As a tracker or time manager, Agenda lets you keep to-do lists, delegate tasks to subordinates, track projects, show what items or tasks depend on other items, and check off tasks as they're done. It lacks only an auto-dialer for phone numbers and a way to track appointments hourly rather than daily. As a text-retrieval program, Agenda can import external documents, find all occurrences of phrases, use Boolean logic in searches, and create the equivalent of keywords or titles.

As hypermedia, Agenda uses a somewhat different procedure from classic hypertext: once all the data is in Agenda, you can create views and categories that show related information. If you want to research a relationship that wasn't immediately apparent, you create an additional view. It's not as sexy as clicking a button to jump from A that's linked to B, which can be linked to C, but it's passable.

Agenda provides 21/2 layers of outlin-

ing. You can see section heads, expand to show items, and expand further to see the note behind an item—but only one note at a time. Categories, however, can be nested 12 deep.

TEXT RETRIEVAL If you want to analyze large chunks of existing text, you can import the data into Agenda using a supplied utility. Some of the most powerful applications of Agenda may be accomplished through this route, and some may go beyond personal to corporate information. This is where Agenda shows its kinship to other text/retrieval and text-database programs. One bank, for instance, feeds Agenda every news story about countries where it has problem loans.

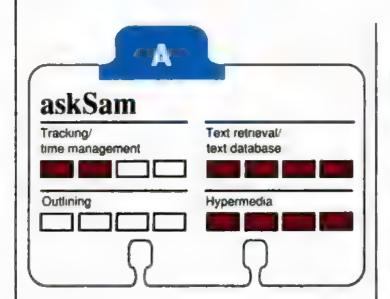
Agenda needs 640K RAM to run (you can just squeak by with 512K), so you can forget about teaming Agenda with a desktop organizer in the background unless you have an 80386-based PC on your desk and Windows/386, or another multitasking 386 operating system, with Agenda loaded as one of the applications. Agenda does supply a utility for the separate Lotus Metro desktop organizer that lets you enter a dozen items into Metro (when Agenda isn't running), then export them to Agenda at your convenience.

Agenda's on-screen look and feel includes a moving-bar menu across the top that's similar to 1-2-3 (it's accessed by F10 rather than the Slash key) and a toggled function-key map across the bottom. Accelerator keys speed up commonly used functions. You can assign your own key sequences to macros.

Printing capabilities are rudimentary. Rather than asking you, "Boldface header line (Y/N)?" you have to type \b\ at the beginning and end of the line. You're limited to 80 characters across, even if you can used compressed print.

Agenda is a best-of-times, worst-of-times product. Its power and abilities lift Agenda apart from the pack. It has the potential to be an important tool for anyone who deals with an overload of information that arrives bits and pieces at a time. But the Agenda metaphor may not work for everyone, and Agenda's learning curve could scare off many of the casual PC-using corporate managers who might well be Agenda's biggest customers.—Bill Howard

PERSONAL INFORMATION MANAGERS



A skSam, a powerful and fast text-based database, is a power user's personal information manager. As such, the \$295 program requires that you spend a good deal of time learning how to use it. But the payback for that investment of time is great because you can use askSam as a very sophisticated personal data-handling tool or an application development system.

askSam is equally happy with structured and unstructured data, making it an appropriate tool for handling corporate as well as personal information. The program affords you total control over the type and form of data you enter as well as many ways to search and report from that data. While the program has neither the preset categories and views of Lotus Agenda nor the built-in outline format of Grand-View—nor, for that matter, the detached but precise method of presenting files for perusal that Zylndex has, it does give you the flexibility to create any of those setups.

EASY INSTALLATION Installing ask-Sam is a breeze. Even though the program is loaded with features, it comes on just two 360K disks and requires only 256K of RAM and one floppy disk drive. askSam's SETUP program is used to specify system defaults. The menu for setting system defaults is deceptively simple for the level of control it gives you. Besides the usual choices of screen color and report margins, askSam lets you specify such fancier options as dialing sequences for its phone dialer and the translation table that determines the order of ASCII characters when sorting files.

Once installed, askSam is run by a series of menus. You make choices either by moving the cursor and tapping the Enter key or by pressing a single letter key. Both

Cylin) next-rec IBM does not regain its position as technology leader with ite new additions to its PS-Z line: Company with its Deskyno 1866 of Sept 1986 has claimed that. But the company has filled gaps in the PS Z line: an enhanced Hodel 58 - the 582 - that has faster BMH, zero wait state, and more responsive and larger hard disk; a series of Hodel 70s that are 386-based units housed in Hedel 50 sized cases. The three 70s offer 16, 20, and 25-Miz respectively with the latter having a MK memory cache and Intel 8235 cache controller to further speed performance. IDM also is adding a \$2,395 scanner with 300 dut-per-inch resolution. Selected price cuts will occur to existing computers in the PS-2 11mm. description . International Business Hachines Corp. namufactures. Company: Ticker: IBM PS Z 50 Z (Nicrocomputer) product introduction IBM PS-2 78 A21 (Hicrocomputer)_product introduction. SIC Code: Topic: **Hicrocomputers** Product Introduction

askSam can import ASCII text files in the form of either 20-line records or full-length documents.

context-sensitive help screens and a help menu are at your disposal. The help file is a regular editable askSam file. The manual includes nine tutorial lessons, a reference section, and an index.

STORING DATA askSam stores information in records and documents, both of which can be kept in the same file. A record can be only 20 lines long, but a document has no size limitation. A document can also hold a number of records. You don't need to worry about record or file structure beforehand or ever, unless you want to.

There are no constraints on how you enter data; you don't even need to do it the same way in different records in the same file. You can, for example, use a unique character, such as an asterisk (*), to mark the beginning of a special field, then switch to field names followed by a left bracket ([). Alternatively, a pair of brackets can indicate where and how long a field has to be.

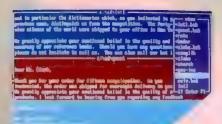
askSam also allows you to type or import free-form text. You can set up entry templates (as many as ten per file) that can be activated by function keys. To save data entry time, you can create overlays of often-used information. And you can mix structured and unstructured data in individual records.

Once data has been entered, askSam offers myriad ways to search for information. You can search for all or part of any word or combination of characters including using the DOS wildcard characters? and *. The simple function \$: lists, totals, counts, and displays the average of all numeric entries in a file that follow a dollar sign.

COMPLEX SEARCHES But don't be deceived: askSam's query language gets tougher as you attempt more-complex searches. It's here that previous searching experience and a knowledge of Boolean operators help. For example, if the query expression "\$ > 0 NAME[\$/4" clearly indicates to you that the program should display the contents from every record of the field called NAME followed by a dollar sign and the result (divided by four) of any numeric entries greater than zero, then you'll have a ball with askSam.

Your searches can get even more sophisticated. askSam lets you perform context searches, which are based on relative location to other data and proximity searches, which are based on stated distance from a given element. In addition you can store queries, perform calculations, and make the program "remember" subsets of data for further manipulation.

askSam lets you specify records as program records, differentiated by having a colon as the first character. These programs can have flow control, conditional actions, and the ability to start other programs. Since you can start askSam from a DOS batch file with specified parameters to call up specific files and records, it's possible to create elaborate automated



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Vq's macros make it easy to add its retrieval and editing power to the applications you're using now. You can call up a program and pass it a file with a Hot Link, or create your own library of custom sequences to invoke with a keystroke. You can find and edit a document before passing it to your desktop publisher, or even Compile and Display Next Error!

Vq doesn't complicate your life. It just adds what's been missing—fast free-form retrieval with integral multi-window editing, for your files and programs.

Vq is for DOS and OS/2 systems.



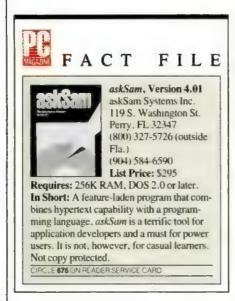
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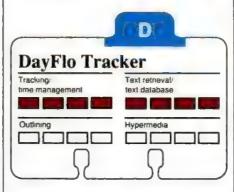
THE COMMON FACTOR Whether your query is simple or complex, rest assured that it will be executed quickly. In fact, speed is the only characteristic common to all of the program's query features. For example, I used the simplest query command to find all instances of the word is in the program's 332K help file, where it usually appears several times in each screen. askSam is so fast that even though I held the Spacebar down on my 8-MHz AT (you go to the next match by hitting any key but Esc), the program always stayed ahead of the standard 13-character keyboard buffer. And askSam doesn't scroll; rather, it continuously rewrites the screen.

askSam also has hypertext, one of the features that make the program handy as a personal information manager. As implemented by askSam, hypertext is a way to treat the words in records as menu items from which to choose files or invoke programs. Hypertext operations can be autoloaded to further control the action of programs.

Because askSam is so fast, you can lose track of what's happening in hypertext mode if you make an error. For that reason, a feature called Backtracking keeps a log of user keystrokes made in hypertext mode to help with problem solving.

A GOOD REPORT askSam's reporting capabilities are impressive. They allow you to create labels and reports with complex format and font control. Totaling reports can have subtotals up to eight levels deep. But like those for complex searches, the commands and syntax for designing reports bring to mind a programming language, requiring you to ascend a steep learning curve.

While the current version of askSam makes it easier to control and switch among program functions than was the case with earlier generations, the program's command structure and exacting syntax may prove very challenging for novice or casual users. On the other hand, those who develop systems for others will find all the flexibility they need. If a compiler or runtime version were available, askSam could be a major application development tool as well as a very sophisticated personal information manager. askSam can tackle just about any datahandling task. The price is the time it takes to master the program.—Bruce Brown



If ever a program deserved to be called a personal information manager, DayFlo Tracker, from DayFlo Software Corp., is it. By pairing field-based forms with freeform text entry, the \$149.95 program offers a blend of structure and flexibility that is hard to beat. Whether you want to build an annotated mailing list, maintain a database of correspondence, or keep notes on phone conversations, DayFlo Tracker can do the job.

DayFlo Tracker consists of the program itself, a version of SmartKey (a keyboard macro program) that will work only with Tracker, and an application pack. As shipped, the package includes two prede-





DayFlo Tracker, Version 1.1 DayFlo Software Corp. 17701 Muchell Ave.

North Irvine, CA 92714 (800) 367-5369 (outside Calif.)

(714) 474-2901 List Price: \$149.95

disk drives

Requires: 384K RAM, hard disk, DOS 2.0 or later. A second version, *Tracker-720*, requires 512K RAM and dual 720K floppy

In Short: Its ability to use field-based forms to add structure to free-form text entry enables DayFlo Tracker to masquerade as a flat-file manager. It can use different forms in the same file, and, with 32,000 characters per record and 65,000 records per database, it's hard to outrun. Not copy protected.

CIRCLE 675 ON READER SERVICE CARD

fined SmartKey macros—for time and date. Either of these can enter the appropriate value into a record with a single keystroke. DayFlo does not include a Smart-Key manual with the package but will supply one for a \$10 handling fee. Although Tracker requires only 384K RAM, it needs about 1MB of disk space and at least 100K for your data files. (DayFlo also sells a laptop version—Tracker-720—intended for computers with two 720K disks drives.)

FIRST IMPRESSIONS At first glance, Tracker behaves like a garden-variety, flat-file manager. The program lets you create fields and designate them as alphanumeric, numeric, date, or yes/no; choose fields to index; and retrieve records based on field content.

But once you get past this bare-bones description, *Tracker* sets its own rules. To begin with, fields have no predefined length. You can type text in any field up to the maximum allowable by the program—32,000 characters per record. You can even type text in nontext fields. *Tracker* will beep and ask for confirmation before accepting the text, but the program will not stop you from entering it.

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DayFlo Tracker's combination of fields and free-form text entry lets you create structured forms like this one. The fields can be as long as you like; records can be retrieved based on the field contents or through a full text search.

Tracker can handle multiple values in each field. For example, you can enter as many keys in a keyword field as you like. The individual values are separated by a special end-of-value marker.

BEYOND FLAT FILES Surely the most interesting feature of *Tracker*—and the one that takes it beyond flat-file database management—is its ability to mix data forms in a file. This gives *Tracker* some of the features of a multifile database management system.

For example, to construct a database of sales leads in a flat-file manager, you would have to create one large form with fields for name, address, phone number, product category, credit rating, income level, referred by, and so on. If you were using a multifile DBMS, you might break this information into three files—one for name and address, one for product category, and one for credit rating. Records in the three files would be tied together by a shared field, such as referred by. With *Tracker*, you can do the same thing by creating three forms that share at least one field.

So if you can achieve the same results using a multifile DBMS as you can with *Tracker*, why not go with the DBMS? Simple. *Tracker*'s ability to handle text gives you the freedom to write extensive notes about, say, each of your sales leads, making it more a notebooklike tool than a repository for unannotated information.

Tracker's multiform feature lets you

store memos, letters, random notes, items for a to-do list, notes for tracking projects, and more. If you include a few well-considered fields on all forms—such as action date, project, and keyword—you can then retrieve records in ways that cut across data-form type, such as all actions to be taken today or all phone conversations, let-

DayFlo Tracker has lots of features hidden in its menus, including a DOS gateway, a columnar report feature, and a mail-merge function.

ters, memos, and status notes related to a given project. The maximum capacity of 65,000 records goes well beyond any likely need.

A FAMILIAR INTERFACE Tracker takes its marching orders primarily through Lotus-like menus. These let you either "point and shoot" or type a highlighted character. Even building a search phrase is fully menu driven, with the program prompting you for each step of Boolean logic and optionally supplying lists of fields and stored values for each chosen field. Function keys supplement the menu

commands. These are not normally displayed on-screen, but they are available on a keyboard template and are listed in an online help screen.

Also noteworthy is the range of search criteria permitted in *Tracker*. For any given field, you can search for records that are equal to, not equal to, greater than, or less than specified values; records that are within or outside a range of values; or records that contain or lack a specified string or pattern. You can even select records that include or lack specific fields. Each search can contain up to ten criteria, which should be sufficient for most users.

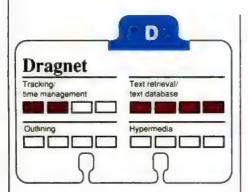
Tracker comes with 15 predefined data forms and 17 report forms for such common needs as memos, letters, and phone notes. The application pack adds 11 more data forms and 29 more report forms, along with SmartKey-based macro menus. The four sets of menus and macros supply off-the-shelf answers for managing contact notes, projects, article abstracts, and DOS files. Even if these don't meet your needs, they can serve as a model or starting point for your own application.

MINOR FLAWS Tracker's flaws are mostly minor. For example, the only color choice is yes or no. And like many programs, Tracker uses its own arcane jargon; storing records in a file means putting them in a metaphorical filing cabinet rather than in a file on your disk. In addition, the manual doesn't tell you how to remove Smart-Key from memory after leaving Tracker. Sorely missing is any documentation for the application pack: before you can modify the macros, you have to decode them.

One potentially serious drawback is Tracker's lack of a background mode; consequently Tracker files are not immediately available at all times. However, I found that Tracker had no problem running under DESQview or Carousel.

Very much on the plus side, DayFlo Tracker has lots of features hidden in its menus, including a DOS gateway, a columnar report feature, and a mail-merge function, among others. Best of all, the features hang together in a coherent package that is easy to learn and fun to explore. The more you use Tracker, the more you'll like it. This is one program that's earned a place on my hard disk.—M. David Stone

■ PERSONAL INFORMATION MANAGERS



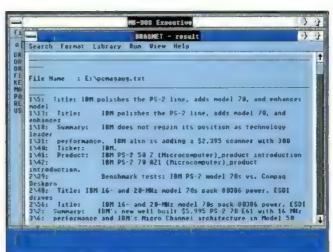
D ragnet, a \$145 Microsoft Windows-based program from Access Softek, is billed as text-management software, a designation that begs for further explanation. Similar in many ways to traditional text-retrieval programs such as Zylndex, Dragnet will search through any ASCII file looking for a keyword or phrase. But the operative word here is similar. The differences are significant.

By getting rid of indexes, *Dragnet* eliminates the indexing chores common to most text-retrieval programs. To look for information, you tell the program which files to search and what to search for. *Dragnet* looks in the original files.

You pay a price for the lack of an index. For example, if you've archived files on floppy disks, you'll want the ability to search for a match and be told which disks to put in your computer. *Dragnet* can't do that because it can search only files that are already available to the computer.

Although eliminating the index also results in slower search speeds, this doesn't tell the whole story. Indexing and reindexing large files can take considerable amounts of time. If you're searching through files that are modified often—such as research notes for a current project—Dragnet will often be faster than programs that rely on indexes.

Dragnet is also a good choice for a onetime-only search. Consider this application: suppose you've written a novel and want to eliminate one of the characters. Dragnet will find all references to that character, and it won't waste time indexing files that you are planning to revise. More important, for each search Dragnet produces a "results" file that shows the filename, page, and line number for each match. The matches themselves are shown



Dragnet's "result file" shows the results of a search for references to IBM in the file PCMAGAUG.TXT. In this example, matches are shown in the context of a single line; other context choices are sentence, paragraph, or custom defined. Note the file reference before the list of matches.

in context—by line, sentence, paragraph, or user-defined section.

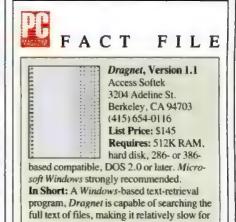
SEE WINDOWS RUN Dragnet comes with a runtime version of Windows 1.0 and two versions of the Dragnet program—one for Windows 1.x, the other for Windows 2.x. (Version 2 of Dragnet, which will run under only Windows 2.x, should be available by the time this issue hits the newsstands. The vendor plans to sell both versions of the program.) To install the runtime version of Windows, you put the setup disk in your drive, type setup, and follow the instructions on screen. If you're already a Windows user, just create a Dragnet directory and copy the appropriate version of the program to that directory. The program's command strategy includes pull-down menus, pop-up dialog boxes, and shortcut commands, many of which are arbitrary (for example, 'R for continuous search, 'X for interactive search).

Dragnet's ability to run searches in background mode is a useful Windows-based feature (though not available in the runtime version of Windows). With the Windows 1.x version of the program, you can run up to three searches. A fourth Dragnet window usually crashes the system. However, this did not occur when I tested the Windows 2.x version using four windows.

The program also has a foreground search mode and an interactive mode. With interactive mode, *Dragnet* shows

you matches as it finds them and lets you decide whether to use each one. You can also modify the amount of text that goes into the result file and can type an additional note.

As you would expect, *Dragnet* lets you define a search by typing both a search phrase and the names of the files to search. Search phrases use standard Boolean logic: they link words together with AND, OR, and NOT and designate priorities with parentheses. The search phrases can also use special wildcard characters for matching numbers, letters, and other specific characters.

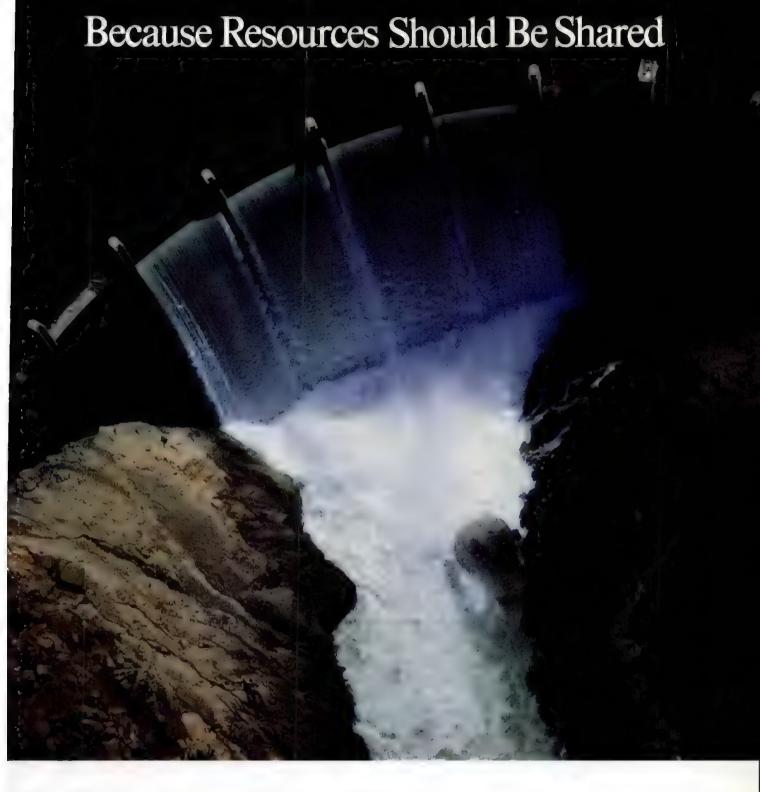


repeated searches of the same files. Where

files are revised regularly, Dragnet's full text

search is faster and more convenient than reindexing the file. Not copy protected.

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■ PERSONAL INFORMATION MANAGERS

BUILDING LIBRARIES Dragnet's most interesting feature is its ability to create libraries of keywords, search phrases, and file groupings. The keyword library lets you enter the words you search for regularly and create a list of synonyms for each word. Synonyms for the word camera, for example, could include Brownie,

Dragnet has a foreground search mode and an interactive mode. With interactive mode, Dragnet shows you matches as it finds them and lets you decide whether to use each one.

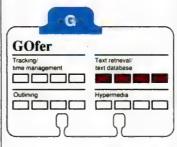
Polaroid, and SLR. You can then use the pattern library to create search phrases, linking synonyms together with OR, so that the search phrase CameraSyn might be "camera OR Brownie OR Polaroid OR SLR".

Having created the phrase CameraSyn, you can call on all the synonyms for camera in a single stroke. Similarly, Dragnet lets you group files together and give them a name. Once you have libraries of phrases and file groupings, you can describe a search by picking the appropriate phrases and file groups from a list. A single search phrase can be up to 510 characters long.

Through the use of phrase libraries, Dragnet comes into its own as a personal information manager. After writing notes in your favorite text editor, including such information as date, type of action, and project name, you can then exploit predefined search phrases and file groups in Dragnet to create lists of all phone calls or meetings on a given date, or all notes about a given project.

SLIGHT IMPERFECTIONS Alas, Dragnet has a few minor shortcomings that mar an otherwise excellent program. For example, once you've entered a name in the library, you can't change it. Instead, you must delete the old name and create a new entry from scratch. A more important limitation is that the program will retrieve only 510 characters in the result file for each match. If you need more than that, you will have to go back to the original file to read it.

Dragnet is tailor-made for searching through files that are open to revision. If you want a text-retrieval program that skips the indexing step, be sure to look at Dragnet.—M. David Stone



Microlytics, the company that brought you Word Finder, has gone to great lengths (even to the very boundaries of good taste) to make GOfer, its \$79.95 textretrieval utility, charming and disarming. The highly readable manual sports a grinning, tie-clad, sneaker-shod rodent on the cover and insists on personifying the program throughout. It might all be too precious if it weren't for the fact that GOfer really is a friendly and effective piece of software. This program is easy to learn,

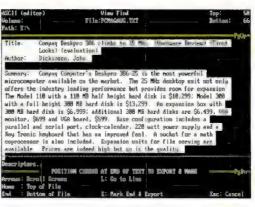
easy to use, and easy to customize.

GOfer's mission in life is to find text on mass storage devices. Given a search criterion and a set of directories or files to examine, it takes off in search of missing words and numbers. Each time it finds what it's looking for, it pauses to display the filespec, the sought-after text, and 16 lines of surrounding material. Having viewed the results, you can export some or all of the file in question to your current application, print it, or pipe it into a new disk file. Or you can send GOfer back to disk to find the next instance of your search text.

Alternatively, you can ask GOfer merely to present a summary list of all the files in which your search text can be found. Unfortunately the program doesn't offer a convenient way to print this filespec summary.

GOfer runs in both resident and nonresident modes—your choice. The TSR mode is extravagant—it chews up anywhere from 94K to 166.5K of precious conventional memory, depending on how fast you want it to work—but it lets you find the information you need directly, without leaving your work context. By default, GOfer uses 112.5K; a simple setup program allows you to increase or reduce its memory appetite.

SIMPLE OR COMPLEX A GOfer search spec can be simple or moderately complex. The "enter text to go for" screen presents two groups of four fields, each of which can hold up to 20 characters. The



Besides doing data searches, GOfer can move files: any amount of text in the "hit" file can be marked for copying into another application.

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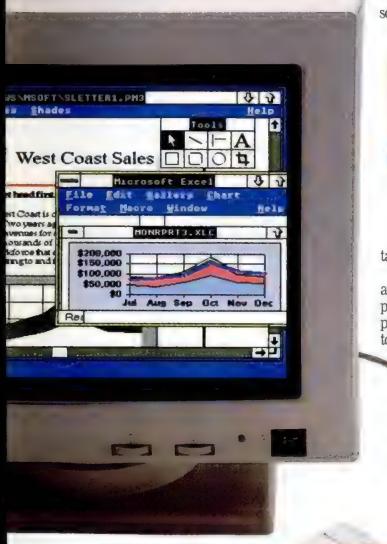
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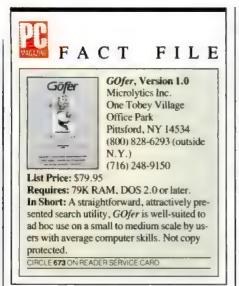
actually come with the Mouse (or vice versa).

Already, the Microsoft Mouse has made
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personal computer users. And that
number is sure to grow even faster. After all,
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fields of each group are joined by OR operators; the groups are joined by AND, NOT, OR, or NEARBY. The NEARBY operator means anything from 1 to 99 lines, depending on how you define it.

By default, searches are carried out in "uppercase and/or lowercase" mode, but you can change that to either "just the way it appears" or "almost the way it appears." The last of these is handy when you don't remember how a proper name is spelled, but for many other situations it produces a search too fuzzy to be useful. GOfer appears to pick up any words that have at least two letters in common with the criterion; a fuzzy search for woman, for example, turns up company, mom, and Compaq, as well as women. A true wild-card character would be a welcome addition to GOfer's search-spec repertoire.

GOfer directly supports 30 applications, including such favorites as dBASE III, DisplayWrite (3 and 4), Lotus 1-2-3, Microsoft Word, MultiMate, SideKick, Volkswriter, WordPerfect, and XyWrite III, as well as a few relatively obscure ones. The configuration program lets you pick up to ten of these programs to have "on board" as you work in GOfer. Then, before you execute a search, you can select the most likely "read from" and the current "write to" program. Choosing the correct "read from" program isn't strictly necessary, but it helps GOfer format the text on-screen when it finds it. Choosing the proper "write to" program lets GOfer transfer data correctly into your current application.

If the program you use isn't on GOfer's list of 30, you can fill in the blanks for up to three "available" slots. Doing this is a bit like making a program information file for Microsoft Windows or DESQview. It requires answering a dozen or so questions about whether your program usually operates in insert or overstrike mode, how GOfer can tell which mode it's in, what filename extension it typically uses, and so on. Reasonably proficient users will find the task quite manageable.

BEYOND SEARCHING GOfer has a few other virtues besides its searching capability. It includes a browse mode that simply lets you select a file and read it without leaving your spreadsheet or word processor. And it offers rudimentary DOS file management functions—copy, delete, and rename.

More important, the program can assist in the archive/retrieval process by compressing and decompressing files. Microlytics says its compression utility will reduce the size of files by up to 50 percent; I compressed about 800 text files and averaged 41 percent. Other utilities can do better than that, but *GOfer* can read its own squeezed files without unsqueezing them first.

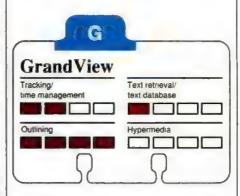
So what's missing? Primarily, the ability to index files for faster searching. Users with truly massive data-retrieval needs might save time in the long run by choosing a program that can create a separate index file, even though indexing itself is invariably a time-consuming process.

How quickly GOfer works depends, of course, on your hardware and the complexity of your search criteria. I asked it to find all references to Quattro in a book stored in 6.7MB of data on my PS/2 Model 80's ESDI disk; it turned up 8,672 hits in just under 4 minutes—fast enough for my needs but possibly not for yours.

GOfer cannot predefine file sets for searching. You can select particular files within a directory, or particular directories (with or without their subdirectories), but searching something more arbitrary—such as a set of sibling directories or a group of files on more than one drive—requires repeated use of the "go for it" command.

In short, GOfer is a straightforward search utility that's well suited for ad hoc use on a small to medium scale by users with average computer skills.

-Craig Stinson



If you like organizing your thoughts in outline form, you'll love Symantec Corp.'s *GrandView*. If you've never used a PC-based outliner, you should check out this \$295 program; it's one of the best.

Producing outlines is *GrandView*'s reason for being, but that's not all the program can do. Features such as categories, macros, advanced text-handling and formatting, sensible but flexible printer control, and a Microlytics spelling checker make *GrandView* one of the top personal information managers as well.

BACK TO BASICS If you've used Symantec's *ThinkTank* or *Ready!*, consider yourself familiar with the basic operation of *GrandView*. If not, six tutorial lessons included in a 250-page user manual cover most program functions, illustrating them with realistic sample files. The program also comes with a 300-page reference guide, a 4-page Quick Start guide, and a 28-page Quick Reference Guide. Context-sensitive help screens are available throughout the program.

GrandView's help screens won't appeal to minimalists: they're chock-full of sections, menus, and prompts and look about as busy as a room full of 3-year-olds. But if you have an aversion to manuals, you'll get along fine just by following the help screens. The program displays horizontal-bar menus for major command sections; more options reside in pull-down menus and pop-up windows.

Besides these menus and windows,

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Importing files in GrandView is accomplished through simple popup windows. Several source-file formats are supported.

GrandView offers several—maybe too many—ways to choose and execute commands. You can select menu commands with cursor keys or a mouse, use single-letter commands, or use function keys and keystroke combinations. In offering all these choices, GrandView's designers clearly tried to suit the different styles of the broadest range of users.

Since outlines are held in memory while you're working with them, they can be only as large as the conventional memory available on your computer. An outline entry, called a *headline*, can be up to 64K in size. You can attach any type of text to a headline in a form called a *document*, which is also limited to 64K. You can use documents to add free-form information about a headline or even to contain letters, memos, and other word processing functions.

POSITIONING HEADLINES It's easy to position headlines using the cursor and control keys. Whether you move a headline higher or lower or make it dominant or subordinate to the headline preceding it, *GrandView* automatically renumbers the outline.

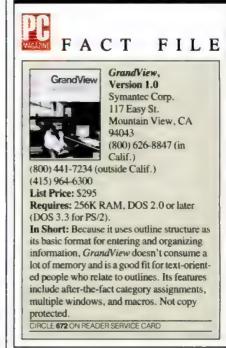
GrandView expands or collapses headlines at your command, in effect letting you zoom in or out of specific parts of the outline. The program uses a clipboard to move text around an outline; you can also copy or move headlines from one section to another. A headline-cloning feature lets you keep the same information in several places within an outline without having to worry about updating each occurrence: when you change one clone, the rest change too.

GrandView uses categories to filter or shuffle headlines, allowing you to look at them in different ways. For example, a todo list might have categories for Type of Activity, Who Else Is Involved, and Supplies Needed. Date and priority categories are included with all outlines, but you can add whatever other categories you wish, such as Person Responsible, Type of Business, or Contact, as long as you don't exceed 20 in all.

Also important is the concept of assignments, or short definitions that summarize the content of important headlines. After you set up categories for your outline, you must assign these definitions to one or more categories. You can then view your outline by assignments.

You have the choice of typing each category assignment or letting *GrandView* do it for you by matching your keystrokes with existing entries. Or you can set up automatic category assignments (for instance, assigning Bob to the Person category for every headline that contains the word *training*). I found this last feature easier to use than a similar one in *Agenda*, but not as robust.

A GRAND VIEW The Category View of a GrandView file is a powerful filtering agent. It is the view that you will probably use most often, since it lets you look at



headlines from many different perspectives. In Category View, the top-left corner of the screen shows the categories you've set up for an outline, and the top right shows the assignments you've made for a category that you've highlighted. The lower part of the screen shows the headlines that match the category and assignment combination displayed in the top two screen sections.

To be sure, that's not *GrandView*'s only impressive feature. The program lets you open up to nine outlines at a time. If you want multiple outlines to appear onscreen at the same time, you can view them as tiles or in folders or have them overlap—enough choices to satisfy most anyone.

You can time- and date-stamp headlines, create templates, and name headlines for reference when copying or moving them (which resembles naming a spreadsheet range). Headline-labeling styles exist for numbers, letters, symbols, bullets, and connecting lines. In addition, you can use the program's macro language with learn mode to create, save, and play back entries or command sequences, and you can reconfigure the keyboard to suit your preferences, changing command-key assignments.





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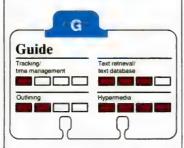
PC12/88

■ PERSONAL INFORMATION MANAGERS

CORRECTINGMISTAKES If you mistakenly delete information, you can use GrandView's undo command to restore that change. While GrandView's undo command lets you rescind only the last deletion, it has the unusual ability to remember the last deletion even if you've exited the program and turned off your computer. To prevent against more-serious data losses, GrandView has an auto-save feature and will also let you save backup copies of files if you desire.

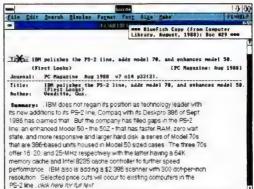
GrandView's printing facility is one of the program's strongest features. Pop-up windows offer many convenient printing controls, including font and style choices for all or some outline levels, or even for selected text. You can print by categories or assignments and can create custom printing formats for blocks of text as small as the paragraph.

Despite all these powerful features, GrandView's way of looking at the world isn't for everyone. But it's the personal information manager of choice for people with an unwavering devotion to the outline method.—Bruce Brown



Owl International's Guide, originally released in September 1986, was the first commercially available hypertext system for PCs. Although, like other hypertext products, the \$275 program lacks many of the features common to personal information managers, it earns a place in this product category for the power it gives you to organize information.

Guide hypertexts, even complex ones, maintain the appearance of word processing documents. Your only clue to their special nature is their use of text styles (bold, underline, and italic) to show the hypertext links. Guide's word-processor-



Moving, cutting, copying, and pasting text are as easy to accomplish in Guide as they are in any Windows application. Although, like other hypertext products, the program lacks many of the features common to other PIMs, it earns a place in this product category for its ability to organize information.

like feel is both its greatest strength and its greatest limitation.

HYPERTEXT AT WORK Here is one example of how Guide works. Suppose you're scanning a list containing the titles and authors of computer articles and you see one that interests you. Using a mouse, you click on the word Summary, which expands that citation into a summary of the article and moves the other listings down. You then click on the word title, popping up a window with the source of the text. When you release the mouse button, the pop-up window vanishes. At the end of the summary, another button takes you to a file containing the article's full text. Guide's big shortcoming in managing this type of data is the lack of batch processing to create the buttons and links. Each one must be created by hand.

Here's another example. You're looking at a textbook on-disk, with links between common topics and ideas scattered throughout. While reading a passage, you see a subject that you want to pursue. You click on the word and find yourself almost immediately somewhere else, looking at related work. From there you follow a similar link to another subject. To return to where you were, a simple click on the Backtrack icon steps you back through the links.

Herein lies one of the most severe limitations of hypertext in its pure form. A hypertext document is only as good as its links. If the links are few or poorly planned, the result may be little better than that achieved by a word processor with searching abilities.

BUTTON TYPES Guide is based on the word link. In Guide, the button consists of a word or a phase. If you edit text and you cause the location of the word to change, the link moves with it.

The program has four main button types. Text style is your main clue as to which text is a button and which type of button it is. The cursor furnishes additional reinforcement by changing into an icon that represents the button type when it passes over the text. Reference buttons-a classic hypertext link-jump you to a new place in the same document or to another document. Replacement buttons expand to show additional text or to replace the button with different text. When used to add detail, they resemble an outliner that allows expansion of individual points. Note buttons pop up a window of several sentences in the upper-right-hand corner of the screen. They are good for help text or minor supporting information, such as the source of the text. Command buttons launch other applications or talk to the serial port.

In contrast to the discrete blocks of text and graphics found in *HyperCard*, the popular hypertext program for the Apple Macintosh, *Guide* uses "parallel strips of writing." Because of *Guide*'s ability to show multiple linked files on-screen simultaneously, you can build a screen of

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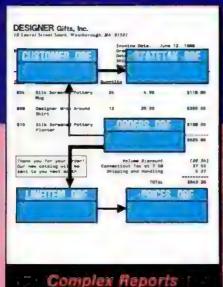
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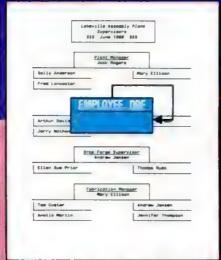
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FACT FILE



Guide, Version 2.0 Owl International Inc. 14218 NE 2 1st St. Bellevue, WA 98007 (800) 34-HYPER (outside Wash.) (206) 747-3203 List Price: \$275

Requires: 640K RAM, hard disk, mouse, DOS 3.1 or later. EGA card strongly recommended.

In Short: While it lacks many of the features found in other PIMs, Guide's hypertext abilities suit some tasks, such as creating interactive documents like textbooks and manuals, very well. Not copy protected.

CIRCLE 671 ON READER SERVICE CARD

text comprising several interlinked files that flow together into a single nonsequential document.

Guide's ability to import graphics into documents sets it apart from many other personal information managers. These graphics can also be buttons. This allows you to include in your document technical drawings or business charts with links to explanations or follow-up information.

AS EASY AS WINDOWS Owl International offers *Microsoft Windows* and Macintosh versions of *Guide*. Both behave similarly. As of this writing, file compatibility is unavailable. (Owl says that it is working on a conversion program.)

Moving, cutting, copying, and pasting text are as easy to accomplish as they are in any Windows application. Guide also offers standard string searching for situations where a link has not been created. The search can include or exclude text hidden under buttons but cannot find linked text in other files.

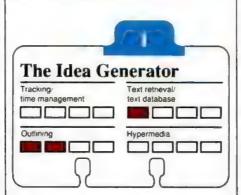
You can change text styles and fonts, except for those that the program has already designated as button types. But, since changes can affect entire sections of text, you can trick *Guide* into changing single words or phrases—or leaving them unchanged—by turning them into buttons first. Owl International's reluctance to encourage the use of this ability is likely due to the confusion it could create. If text style

is your main visual clue to button type and location, then using bold, italic, and underline for other reasons is probably ill-advised.

Although Guide has nothing comparable to HyperCard's powerful HyperTalk programming language, it does offer some programming capabilities beyond text links: Guide's Command-button scripts let you launch other applications if you're running under a standalone version of Windows.

Still, the Command-button scripts that let you run other programs from within *Guide* don't have the versatility or power of a feature-rich programming language like HyperTalk or the extensive macro language of *Agenda*. As for organizing all those little notes and random documents that accumulate on your desk—or for managing projects and people—look to personal information managers that specialize in handling those tasks.

Nonetheless, in hypertext operations, Guide excels. It is easy to use and powerful enough for business applications. Although the lack of a way to organize text and links automatically makes cataloging large amounts of data a tedious process, the results may be worth the effort. For creating interactive documents, such as textbooks and manuals, Guide does an excellent job and should be strongly considered.—Philip F. H. Rose



Experience In Software was founded with a single goal in mind: to come up with software adaptations of techniques presented in Gerard I. Nierenberg's popular self-help books on negotiating and problem solving. The Idea Generator, the company's second product, is inspired by the book The Art of Creative Thinking,



List Price: \$195

Requires: 256K RAM, two disk drives (hard disk recommended), DOS 2.0 or later. In Short: Designed to help users come up with problem-solving ideas, *The Idea Generator* is based on an interesting concept but suffers from limited text-organizing facilities. Not copy protected.

CIRCLE 659 ON READER SERVICE CARD

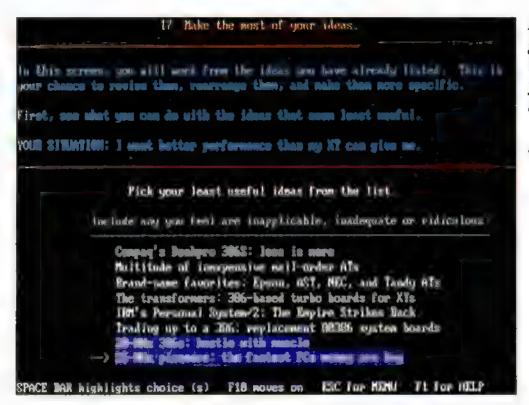
which is included with the \$195 package.

As its name implies, *The Idea Generator* is designed as a catalyst for producing ideas on how a specified problem could be solved. It works primarily by helping you cast the problem in different lights in an effort to get the creative juices flowing. It really has no application beyond this quite limited purpose.

DEFINING THE PROBLEM Using the program couldn't be simpler. It guides you through each step of its problem-solving process with detailed prompts, explanations, and advice. First, you're required to define the problem and list the goals you wish to accomplish. You're asked to rate the importance of each goal, and the program then reorders the list to reflect this. You must also list all the people involved in the situation.

In the second stage—the real meat of the program—you generate your ideas for solving the problem. From a menu, you select any or all of seven methods you want to use to give your creativity a swift kick in the pants. These include the following: Think of metaphors for your situation (such as building a house or getting ready for a trip) and then apply approaches to the metaphorical situation to your own problem. Think of ideas that might spring from the other people involved in the problem or from the "voices" in your head (realist, idealist, parent, and so on). Consider the

■ PERSONAL INFORMATION MANAGERS



In the ideageneration stage, The Idea Generator gives you a chance to discard ideas you feel won't be useful and to expand others.

opposites of your goals, think of how you might achieve these reversed goals, and then consider the opposites of these approaches.

The point is to jot down as many ideas as you can, no matter how silly they seem. You're then given the opportunity to hone each idea or to discard it altogether. If ideas pop into your head that have no relation to the part of the process you happen to be in at the time, you can save them by activating the pop-up Idea Screen to jot them down. These random ideas will then be added to your collection without interrupting the sequence of the program.

MAKE IT BRIEF One limitation of the program becomes immediately apparent at this stage. Your ideas are restricted in length to 54 characters each. While this does force you to be concise, I found myself squandering time trying to devise abbreviations that would let a longer idea fit in the space available.

The final stage of the process lets you evaluate the relative merits of the ideas you've come up with so you can pick out the best ones. First, you rate the quality of each idea on a scale of 1 to 9, and *The Idea Generator* reorders them accordingly. You can then highlight any ideas you wish to evaluate further. The next step is to use the same scale to rate how well each idea meets each of your goals. The program then takes this information plus the weight you gave each goal and generates a single rating for each idea. Since the ratings ac-

cording to goals appear in a column next to your ratings according to overall quality, any significant discrepancies between the two will catch your eye. A nice addition to this phase of the process would be another reordering of the ideas based on the combination of these two ratings.

costs and benefits of each idea you've rated. Unfortunately, Experience In Software misses a bet by not ranking your ideas according to their cost/benefit ratio. It could even let you assign different weights to each pro and con. This option would also let you list the effects of each idea on all the people involved, but again the program makes no analytical use of this information.

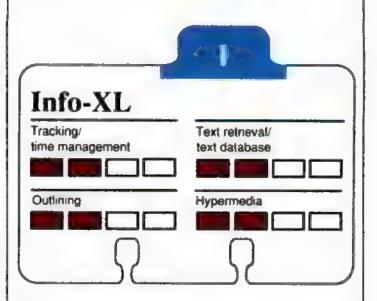
When you finish each stage of problem solving, you have the option of generating a summary report of all the goals, ideas, and ratings you've entered at each point in the process. You can display the report onscreen, write it to disk, print it, or export it in *ThinkTank* format. (Conversion to *Agenda* format should also be available by the time you read this.) In addition, you can save entire problem-solving sessions under different names and then call them up later to finish them or to redo any part of the process.

One of *The Idea Generator*'s liabilities is that it doesn't let you generate subsidiary ideas under a main idea—a significant weakness since this is an important part of the creative process. Conversely, if you

find yourself with a number of related ideas, you can't group them together and treat them as a unit. One option in the ideagenerating stage lets you regroup related ideas together in your list, but this is generally a temporary procedure and is done mainly to help you spawn more ideas in the same vein.

At first glance The Idea Generator may seem like merely a flaky outgrowth of the self-help boom. Upon closer inspection, though, it turns out to be an interesting distillation of some useful problem-solving approaches. For some it may well prove to be just the thing to get those ideas flowing. However, the product's strength lies in the intellectual concepts underlying it rather than its information-handling capabilities. Until the package delivers more of the functionality that people turn to computers for—such as better facilities for organizing ideas and more analytical functions to evaluate them—there's the danger that people will use it a few times, absorb the concepts behind it, and then abandon it in favor of a more flexible product to handle the real day-to-day work.

-Robert Kendall



By offering formal and informal data formats along with outlining, a monthly calendar, a daily scheduler, and six interrelated windows, Valor Software Corp.'s *Info-XL* gives you a multifaceted view of information. The \$295 program lets you search through several of these windows at once and cross-reference data, tying together different kinds of information in every way that counts.

Info-XL's main organizing window is called Manager. It might just as well have been called Skeleton, because it holds your information in outline form. Every entry is

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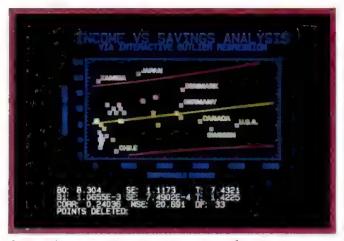
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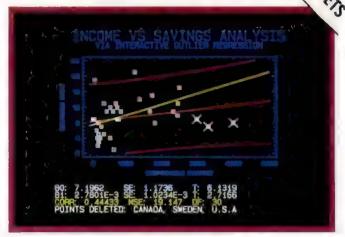


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PERSONAL INFORMATION MANAGERS



Info-XL uses six windows to display related pieces of information. In the default arrangement shown here, the Manager window has a structured outline of the information that is dynamically linked to the structured data in the Records window and the freeform text information in the Comments window.

considered a heading; each can be indented to create sublevels as deep as you want. Levels can be collapsed or expanded to control the amount of detail you see.

SIX WINDOWS For every entry in the Manager window, you can have a Record and a Comment, each in its own window. The Records window is database-like, requiring that you enter information in fields. *Info-XL* offers you five record types, but you can add or delete fields in these records or create as many new record types as you like.

The Comments window is where you enter free-form information up to 10K in length. It's here that you also find such basic word-processing functions as find and replace. You might want to use it for entering notes about people or companies, a history of telephone conversations, meeting minutes, research memoranda, reminders, article summaries. Text entered in the Comments window can also be cut and pasted into the Records window.

In this initial version of the program, the Comments window is also the place where you import ASCII, WordStar, and other word processor files. The importing feature is somewhat crude, requiring you to do a lot of cutting and pasting as well as keying headings into the Manager window. But you can record a keyboard macro to make this procedure somewhat more palatable. Of course, you can use the macro feature to record and recall other repetitive operations or strings of text as well.

According to Valor Software, the program's importing facilities will be improved in Version 1.1, which is due out by the end of the first quarter of 1989. The revision will allow you to send data directly into the Manager and Records windows, and will also let you import comma-delimited ASCII and dBASE files. Version 1.1 will have on-line help, new documentation, and a phone dialer.

A Daily Schedule window shows you the headings you have dated and time-stamped in the Manager window. You also get to see the higher-level heading under which an entry falls. A speed-key combination of Ctrl-G lets you jump from a highlighted item directly to the corresponding heading in the Manager window.

The Monthly Calendar window, which is linked directly to the Daily Schedule window, presents a month's worth of information and highlights dates to which activities have been assigned. Placing the cursor on a day with activities displays them in the Daily Schedule window. The link between the Daily Schedule and Monthly Calendar windows makes it easier for you do such things as plan and review projects and maintain to-do lists.

TIGHT INTEGRATION Because different pieces of related information are linked through Manager headings, they become visible at once. An event heading located in Manager could be linked to relevant information in Records, Comments, and Daily Schedule windows.

Besides showing information that is directly related, Info-XL lets you move quickly to more distantly connected data by scrolling to different levels of headings in the Manager window. For example, you might go from the listing of a customer to the listing of a competitor, and then to a particular product of that competitor-with a list of product specifications in Records and several competitive sales approaches in Comments. Best of all, you never have to open and close different database files to do all this. You can even connect sections of the Manager by putting the same heading in a number of places and marking them as linked. Then you can jump from one linked entry to the next.

Info-XL's Search window holds the results of a search performed on Manager, Records, or Comments windows individually or in consort, letting you bring together information from various places. You perform a search by specifying a text string; the degree of proximity, which is the relative exactness of the search match; the windows to search; and its scope. Executed properly, a search will yield the appropriate Manager headings with their parent levels shown alongside. You can go directly from a search hit to the heading in Manager by using the Ctrl-G speed key.

Unfortunately, the program doesn't let you perform true multiple searches or use Boolean connectors. But you can combine



FACT FILE



Info-XL, Version 1.0 Valor Software Corp. 2005 Hamilton Ave. San Jose, CA 95125 (800) 648-2567 (outside Calif.) (408) 559-1100 List Price: \$295

Requires: 384K RAM, DOS 2.0 or later. In Short: An easy-to-use personal information manager that offers outlining, free-form text entry, a monthly calendar, and a daily scheduler, as well as a more formal database structure. The program is strong on tying together interrelated information through the use of six windows but lacks full-bodied search capabilities. Not copy proctected.

PERSONAL INFORMATION MANAGERS

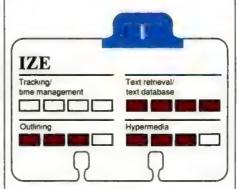
the results of several specific searches, thereby closely approximating multiple AND searches. Or you can type different topics into the search string and, by choosing a loose degree of proximity, hope to net topics that might be found by traditional OR searches. However, these loose searches are bound to bring in information that is far from the mark.

Info-XL comes with five preset window configurations. The default configuration shows five windows at once: Manager, Records, Comments, Daily Schedule, and Monthly Calendar. The other configurations group the windows together differently and size them appropriately.

The program actually lets you create as many screen configurations as you like by moving, sizing, and hiding windows, affording you great viewing flexibility.

Info-XL's main weaknesses are its somewhat limited search capabilities and its inability to import dBASE and comma-

delimited ASCII files. Its main strength is its suitability to an almost endless variety of applications. Easy to use and tightly integrated, *Info-XL* shows a lot of promise.—Henry Fersko-Weiss



ZE (pronounced "eyes") from Persoft is nothing if not ambitious. A hybrid of features culled from text-retrieval programs, outline processors, and hypertext,

the \$445 program proves a new breed of software can offer solutions to an old problem: how to organize documents you create with various application programs into one coherent retrieval system.

IZE can index and retrieve files that reside in the native format of any number of other application programs. IZE manages this by dynamic linking to the executable application program and automatically invoking it to give you useful access to a document that it has retrieved. You don't lose access to your favorite word processor or spreadsheet program because IZE contains drivers that can dynamically link to 39 other application programs, including Lotus 1-2-3, WordPerfect, ThinkTank, O&A, Microsoft Word, and Quattro. Alternatively, IZE can store entire documents of up to 32K in length in an internal textbase. Each textbase in turn can store up to 32,000 separate *IZE* documents.

The IZE textbase is related to a database

How the competition stands

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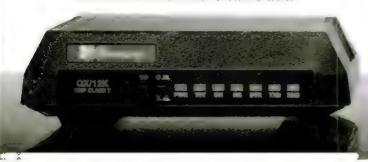
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only in the sense that you cannot access the individual files from DOS. However, unlike a database's structured fields, each *IZE* document looks and behaves like a standard word-processing file.

You can create documents by using the

IZE organizes documents you create with various programs into a single coherent retrieval system.

IZE text editor, importing ASCII files, or translating files from the 20 word processors supported. You operate the simple text editor with either a well-organized menu or mnemonic control-key com-

mands. Be warned: I found *IZE*'s internal text editor to be ill suited for creating long documents. *IZE* is no substitute for your favorite word processor.

The worst thing that I can say about the IZE dynamic linking is that it is a bastardized version of hypertext—and as a result, it can be awkward to use. The best thing that I can say about it is that it really works. At installation, you must install the drivers for the programs you may want to execute from within IZE. From that moment on, files created with that application are available to you by choosing the dynamic-link import function from the File menu.

When you dynamic-link-import a file, you don't really import it. Instead *IZE* creates a little internal textbase file that contains a pointer icon. Simply place your cursor on the diamond-shaped icon and hit Enter. *IZE* will then make a backup of itself to disk (about 500K), reserve a 30K kernel of memory, invoke the appropriate



application program, and call up the correct file.

The 30K kernel that IZE reserves in

up to Telebit's newest modem.

And here's another big difference. Since the T1000 runs the most popular communications software at the highest possible speeds. You can take full advantage of packages like HyperACCESS, Crosstalk-Fast, MicroPhone II, and Acknowledge.

Just plug us in, and the T1000 will fit right in. No matter what your environment.

Remote management for ease of use.

Here's the final difference. The T1000 offers a host of remote management features. Including remote access, remote configuration and remote diagnostics.

So get the modem that's head and shoulders above the rest. In features and performance. At just the right price. Telebit's new T1000 Multi-Speed Modem. Call 1-800-TELEBIT or

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Or write Telebit at 1345 Shorebird Way, Mountain View, CA 94043-1329. Fax: (415) 969-8888.

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T1000.

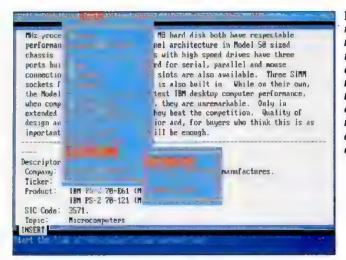


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*optional



■ PERSONAL INFORMATION MANAGERS



IZE's drop-down menus make the transition from novice to expert user easy by listing both the single keystroke that will invoke a command from the menu and the alternative Ctrl-key combinations.

memory allows you to pop up a window where you can append keywords to the file. Other than that, you are truly in the application of your choice and can make changes to a file. This is ideal for anyone who needs to index a large number of files but also needs to constantly update those files. *IZE* ensures that the file you retrieve is up to date because, very simply, only one copy of that file exists on-disk. *IZE* shares access to the file with the program that created it.

The pointer file functions as a normal IZE document in all other respects. You can enter lengthy and detailed descriptions of the file to which it points. These descriptions come in handy because you must exit the application program conventionally in order to do another search. IZE does wait in memory to leap back to your screen when you leave the other application, but in general the process is clumsy and a waste of time if you are doing multiple searches. By allowing you to add descriptions to the pointer file, IZE hopes that you will be able to search many pointer files and path out to an application program only for a hit.

DIAMONDS AND TRIANGLES IZE also contains a second, more elegant implementation of dynamic linking. Small triangular icons (a variation of the diamond mentioned above) can directly link IZE text files to one another. Place your cursor on an icon, hit Enter, and you are whisked to its companion icon in another

file. Files can contain many pointer icons; these icons can be positioned anywhere in the file, and they indicate the direction of the link. Shaped like arrowheads, the first triangle points forward to the right, and its link points backward to the left.

You begin to create a link by choosing the function from the menu. *IZE* allows you to search for the file you wish to link to with all of the standard search functions. When you find the right file, you invoke the menu again and choose the Finish Link option.

Once files are created, imported, or linked, you must designate the keywords that *IZE* will use when retrieving the files. The function keys are reserved for file and search operations; F4, for example, highlights keywords. After going through a 20-minute tutorial, I found using the function keys preferable to executing the same commands from the menu.

Hitting F9 starts the search process. You fill in an entry form with either a single keyword or a complex Boolean statement. *IZE* allows you to use all the standard AND, OR, and NOT combinations, as well as fuzzy searches on keywords, date searches, and searches for quoted strings. This kind of flexibility in your search parameters gives you the power to weave your retrieval net as fine or as coarse as you wish.

Unlike other text-retrieval products, IZE conserves disk space by using an algorithm instead of an index to perform nonkeyword searches. I was pleasantly surprised by the speed at which *IZE* performed nonindexed searches.

RELATED FILES IZE responds to every search request with a list of the files that match your parameters, but with a unique twist. It automatically puts the results of a search into a hierarchical outline based on the number of files that share keywords. This simple set-and-subset method generates an intelligent outline that shows files in relationship to one another.

The *IZE* outline speeds searches by supplying a context in which to review the results of your search request. The outline also functions . . . well . . . like an outline. You can expand it or contract it down to main section headings. More important, you can perform group functions, such as file locking or deletion, on an entire section of the outline.

CONTROL OVER KEYS The lynchpins of an accurate file-retrieval system are the keywords on which you search. IZE maintains impressive control over keywords in the form of keychangers, keyword filters, and guidelines. With them you can automate and influence assignment, searching, and outline generation.

Guidelines are the simplest tools. You use them to create a template, which *IZE* must then follow to generate an outline. It's a direct method of controlling the shape of the information.

Keychangers and keyword filters are more-powerful tools. When importing a group of files, you can instruct *IZE* to assign a keyword automatically to all files, whether or not that word actually appears in the text. Alternatively, you can have *IZE* designate a certain word as a keyword whenever it is encountered. You can even tell *IZE* that it should designate whatever it finds between two strings as a keyword. For example, importing a group of letters and designating client names as keywords requires only that you instruct the program to pick up everything between the word *Dear* and a comma as a keyword.

Keyword filters influence searches and outlines. *IZE* understands equivalencies where many words can be considered as one. By using a special syntax (for example, editorial: editorial = editor = edit =

(continues on page 137)

The future of personal computing now rests on just one thing.

final focus that original Microsoft vision. Through Windows, any number of software applications will seamlessly integrate. Sophisticated spreadsheet pro-

riving the network.

Powerful word processors. Interactive databases. All effortlessly accessible.

And in MS° OS/2, the new operating system we developed jointly with IBM, the Windows technology (called Presenta-

tion Manager) gets even more exciting. Opening up mega-amounts of power and memory. Opening up your screen to do several tasks at once. And opening up endless possibilities for developers using the Microsoft family of languages.

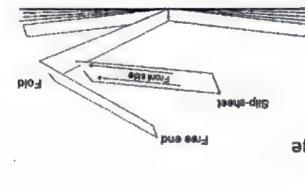
But all this doesn't end at the desktop. With Microsoft OS/2 LAN (local area network) Manager, it's as easy and natural to work on a network as it is to work alone.

By linking users via software, information can be shared and exchanged by members of a group. Projects are worked on together, instead of bit by bit. And it's amazing how a company communicates once it's joined by electronic mail.

There is no question that the advanced productivity springing from today's personal computer is the direct result of our continued commitment to superior technology.

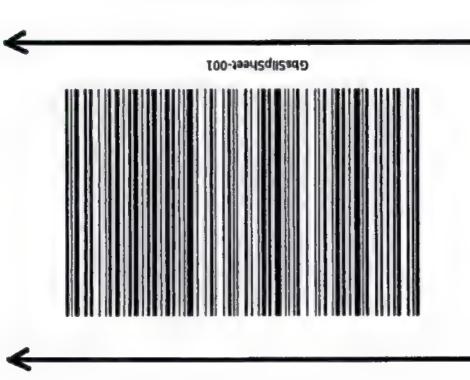
But even so, that's only half of the equation.





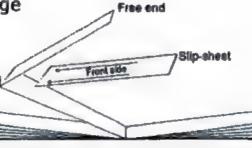
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 - 1. Open the foldout page

Foldout slip-sheet



Inverted Foldout slip-sheet

- 1. Open the foldout page
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- 3. Slice the folded edge
- 4. Close the page and slip-sheet



Folded edge of the page

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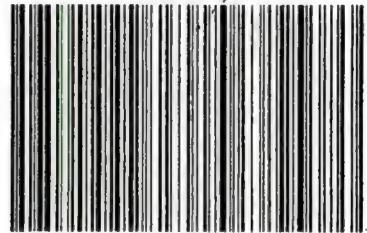
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- --,

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Back

GbsSilpBack-0018



Inverted Back

1. Follow instructions on the other side

At Microsoft, first we make it possible.

If you happened to catch the January 1975 issue of *Popular Electronics*, you were one of the lucky few to witness the debut of the personal computer.

Impossible as it seems, a magazine with less than one-tenth the readership of *Time* or *Newsweek* launched a technology race roughly parallel to that of the space program.

It also launched a company that immediately assumed center stage in the exciting

new world of personal computing. The company was Microsoft, and the tenet upon which it was founded was a simple one. To see a computer on every desk and in every home.

To take that rudimentary new

contraption that was the early personal computer and turn it into the powerful machine that has literally changed the way we work, required some important

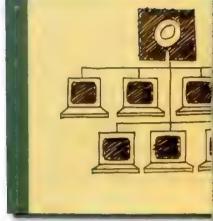
steps. The first order of business was to create not simply products, but standards. Microsoft* BASIC became the first universal programming language for the personal computer. And set a standard upon which an industry could grow.

Next came what

is now the world standard PC operating system, MS-DOS, developed by us and chosen by IBM for its first personal computers. Today, 20 million machines run on it, and so does a billion-dollar software industry.

And when the Macintosh® was

being developed, we were there. That early participation allowed us to write its richest and most important software. These crucial pieces include the powerful



Networking made practical, with software a

Microsoft Word, the muchapplauded Microsoft Excel, and Microsoft Works, the singlesolution program for the diverse needs of small business.

As we were contributing to the development of the Mac, we were also developing a system to put graphics interface technology into the world of IBM* PCs and compatibles.

The introduction of Microsoft Windows in 1985 meant that an easy-to-understand desktop graphical environment now appeared on PCs. Ultimately, this friendly screen will forever replace the cold theater of character-based computing.

But Windows is more than just a useful tool. It is an important technological feat, one that becomes critical to bringing into



The world wasn't waiting. We were. The PC makes its debut.







MAKING IT ALL

MAKE SENSE

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working with pictures makes the work you turn out much more interesting. Which is why the introduction of Microsoft Windows to the IBM PC and compatibles brought with it a whole new category of software with impressive credentials. Like

a more finished look. And no matter what application you're using. Windows will take over the job of running your printer.

There is also a hardware complement to graphical applications: the Microsoft Mouse. An unprecedented 1.5 million users have found that a simple point and click elimi-

nates complicated keyboard commands.

Our Windows spreadsheet

The Fortune Teller

so far bevond

just simple

number-

crunching

that it has

macros from other programs. The new generation of PCs will run OS/2 with Presentation



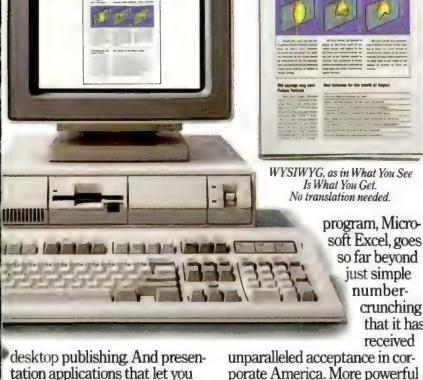
screen to even greater heights. By unlocking the capability of these machines, users can easily switch between programs almost instantly. Members of a workgroup can work together on an unlimited number of tasks.

And finally, every kind of program, from spreadsheets to electronic mail to word processing, works in a common way. To the user, learning one is a quick step toward learning them all. To the corporate bottom line, it means far less valuable time and money are spent on training.

But the real practicality of the graphical user interface comes to life when, inevitably, it appears on every computer screen, everywhere. And networking becomes not only possible, but required in this competitive world.

When you think about it, the goal Microsoft set in 1975 of seeing a computer on every desk and in every home seems close at hand. Because, at Microsoft. our fierce pursuit of technology comes with a promise to keep.

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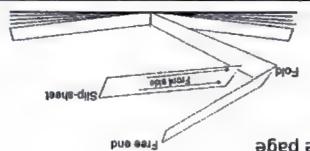
create a sophisticated graphics show, from your office instead

With Windows giving laser printers their marching orders, all manner of documents take on

of the art studio's.

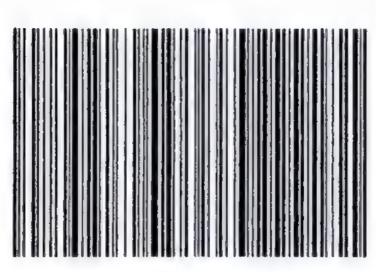
received unparalleled acceptance in corporate America. More powerful than any other, it also easily delivers sophisticated charts, graphs, text and data pulled simultaneously from several sources. And to make it even easier, we built it to graciously accept files and

Microso Making it all make sense.



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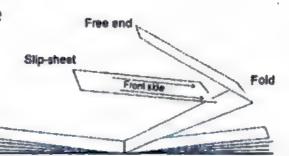
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Foldout slip-sheet

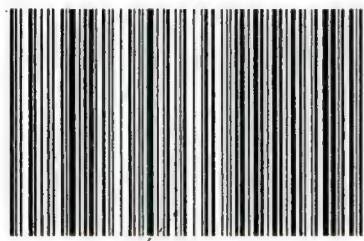
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- 3. Slice the folded edge
- 4. Close the page and slip-sheet



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J. Follow instructions on the other side

Inverted Back



GbsŚlipBack-0018

Back

1. Follow instructions on the other side



Thenw itprac

The philosophy behind Microsoft includes another, equally

File New Open... Save .. Save As.. Change... Exit About ...

Easy commands from pull-down menus make window-shopping easy.

important, notion. That all the technology in the world doesn't add up to a hill of beans unless it is practical. useful and. above all, easy.

Unless it makes sense. That's why, whether you're using a Microsoft application on a Mac, an MS-DOS or even an OS/2 machine, it will have a comforting familiarity. Because today's computers share a common software guardian. Microsoft.

Thanks to our groundbreaking work on the graphical interface for the IBM PC and its compatibles, virtually every personal computer can give its user a simpler way to get a lot more done. With a screen that thinks in pic-

tures instead of words, arranged like papers on a desk. Naturally,



Microsoft® Making it all make sense:

■ PERSONAL INFORMATION MANAGERS

manuscript) you tell *IZE* not only to return all files containing these keywords in response to a search request that contains any one of them, but to always head the section of the outline with the word that is being defined (in this case, editorial).

The utility of keychangers and keyword filters is greatly increased by your ability to save and name them. They are active only when they are loaded, and you can load and unload them whenever you choose. These tools can color your view of the information in a textbase in much the way that a filter works on a camera lens.

In all cases I found the guidelines, keychangers, and keyword filters easy to use and well implemented. Only one thing is lacking: *IZE* should generate a file of all the keywords assigned to a textbase. That file should be viewable and editable. *IZE* currently generates a file very much like this, which it reserves for its own use.

NICE TOUCH The complexity of IZE is rivaled only by the thoughtfulness of its design. Nice touches abound in this program. For instance, IZE includes instructions that let you write drivers for programs that it doesn't currently support. If you can run a program from the DOS command line, then you can create an IZE driver for it.

IZE also saves search requests for which there are no matches. On those occasions when I created very complex search parameters, or so completely misspelled a keyword that the program could return no matches, I didn't have to completely retype the search field. This may sound like a small point, but it can save lots of time.

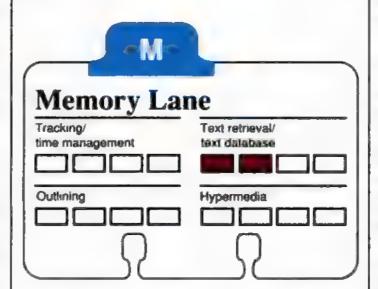
SON OF IZE *IZE* is a promising first-generation personal information manager, so it's understandable that it could benefit from improvement. Dynamic linking to external programs is a unique approach to an old problem, and I appreciate having access to a file along with the ability to modify it.

However, it would be helpful for *IZE* to have a view-only option so that you can quickly look into a number of files before invoking the application program. Hitting the Esc key could get you back to *IZE* in one keystroke and as many seconds. That

kind of functionality is not unheard of: the new version of *The Norton Commander* can now show *Lotus 1-2-3* and *dBASE* files on-screen, and even *PC Magazine*'s free utility DR.COM displays word processing files.

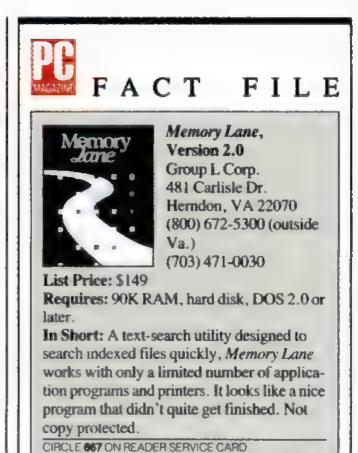
In addition, Persoft should (and, I am told, will) consider support for LIM 4.0. *IZE* would be much more useful, and more used, if you could pop back and forth into it. Installed as a standalone program, *IZE* requires 512K RAM, and that means you really cannot run another major application at the same time. You can configure *IZE* to run as a TSR, but at a minimum RAM requirement of 300K, you would have to be congenitally silly to try.

IZE requires a substantial commitment of time (yours) and memory (your computer's) to work correctly. However, the payback is a powerful organizational tool that delivers both linear connections between files and contextual outlines. Either gives you new insight into the contents of your files.—Luisa Simone



Memory Lane is a \$149 text-search utility aimed at users with heavy-duty search/retrieval needs. Like GOfer, it's a TSR program that can be called up from within any application. Also like GOfer, Memory Lane can funnel the text it finds (plus any amount of surrounding material) into your word processor, spread-sheet, database, or whatever else you happen to be running. In spirit and execution, however, Memory Lane is quite a different critter from GOfer.

To begin with, Memory Lane expects to work with indexed files. It will perform unindexed searches, but its normal MO is to index a specified set of files and then carry out its retrieval operations on the in-



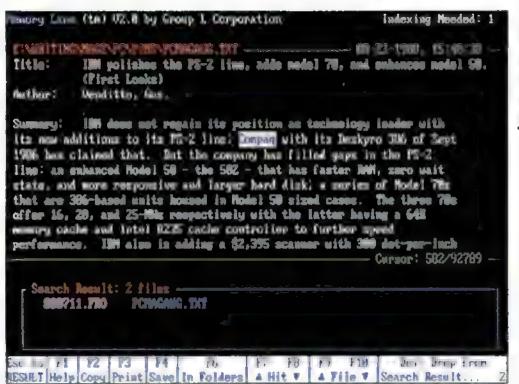
dexed file. This approach produces extremely swift searches. A large-scale search involving 6.7MB of data required about 10 seconds in *Memory Lane* and 3 minutes 50 seconds in *GOfer*.

The trade-off for such speedy performance is twofold: the time required to create and maintain the index, and the disk space needed to house it. Indexing those 6.7MB of information took about 45 minutes and generated a 1.8MB file. In other words, the space overhead for the index turned out to be about 26 percent of the data indexed.

I obtained these results using Memory Lane's higher-performance option. A low-er-performance option is said to use about half as much index space but results in longer search times (the Memory Lane manual says that space overhead may reach 15 percent and 30 percent, respectively, for the low-speed and high-speed alternatives).

Maintaining the index is relatively painless. As you modify data files in the course of your daily work, *Memory Lane* keeps a list of those files that have changed and prompts you to reindex them. Newly created files can easily be added to the index, and deleted files are automatically removed from the index. Theoretically, therefore, keeping *Memory Lane* abreast of your data should be a simple everyday chore.

■ PERSONAL INFORMATION MANAGERS



Search "hits" in Memory Lane are shown in 13 lines of context; the context can be expanded to fill the screen.

Because the index file may grow quite large and you may seldom need to search the whole thing, the program lets you break the index up into logical subsets called *folders*. A folder may consist of a set of files created by a common application, a set of files that have met some particular search spec, or any arbitrary collection of

Like GOfer, Memory Lane can funnel the text it finds
(plus any amount of surrounding material) into your word processor, spreadsheet, database, or whatever else you happen to be running.

files and/or directories. Folders may be added to, deleted from, and combined. Files that satisfy a search operation are automatically grouped into a transient folder to simplify iterative searching.

Search specs may include up to three criteria joined by OR operators. You can embed proximity operators within each criterion, so it's possible to say, in effect, "Find me Jones within five lines of Smith OR Smith within five lines of Williams."

MEMORY LAPSES Search specs involving AND criteria require the iterative approach—first you find the files that meet criterion number 1, then you refine that set by looking for criterion number 2, and so on. So far, so good. *Memory Lane*'s iterative approach should be an attractive system for users who need to apply it often and have enough data to warrant the indexing overhead. But there are problems.

For starters, you can run the program only as a TSR. It uses only 91K, but even 91K may be too much to give up—particularly for users of Framework III, Paradox, PageMaker, and similar resource-consuming applications.

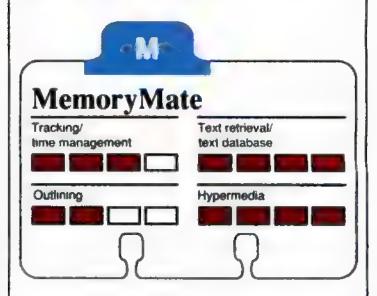
A far more serious deficiency is Memory Lane's embarrassingly weak application support. The list of programs that Memory Lane knows how to get information from and transfer information to includes the long-forgotten Easy Writer, Framework I, Versions 1 and 1A of Lotus 1-2-3, and other ancient favorites. Microsoft Word, MultiMate, Paradox, Super-Calc, and XyWrite are all there—but not in their current revisions. All this from a program whose disk files are dated March 1988.

Memory Lane does include an "application unknown" option, which presumably works with most ASCII text and editors. But if it doesn't happen to work well with yours, you may be out of luck.

Printers aren't supported any better than applications. There's no provision for nonstandard page dimensions (or even for noncontinuous paper feeding). And for some reason, text sent to the HP LaserJet Plus runs off the right side of the page.

On top of these frustrations, the *Memory Lane* user has to cope with a poorly written, poorly indexed, anemic manual.

All in all, Memory Lane looks like a nice program that didn't quite get finished.—Craig Stinson



On my kitchen counter I've got the most amazing appliance. It looks like a cross between a blender and a spaceship. It mixes, blends, cooks, juices, and even kneads dough. The only trouble is, I never use it. The manual is about 2 inches thick, and I spend more time figuring out how to master the machine than I do using it.

In the drawer under that same counter, I've got one of the simplest kitchen gadgets ever devised: a waiter's corkscrew. It doesn't do very much, but I've used it so often that the finish is almost completely worn off the handle. Among personal information managers, *MemoryMate* is much more like my corkscrew than like my space-age, labor-saving contraption. *MemoryMate* does just one thing: it organizes the random notes that would otherwise gather in a pile on my desk, but it does that one thing simply and efficiently.

HAVE IT YOUR WAY Technically, MemoryMate is a memory-resident, free-form text database. You create records by typing text, importing an ASCII file, or grabbing text from an application screen. Records can be up to 120 lines (of 80 characters each) long, and there can be more than 32,000 records in each database file. You can create as many separate files as you want. Since it's memory resident, your text database is available at any time,



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Allows unapplied credit memos.

Open invoice and/or balance forward. Allows unapplied payments. Prints statements. Handles recurring accounts receivable. Supports partial payments & finance charges.

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INVENTORY

Supports: LIFO, FIFO, weighted averages & standard

Supports markup, margin or list. Allows up to 4 places to right of decimal for unit cost & price.

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Supports service or product oriented businesses. User defined tax tables including multiple sales

Prints packing slips.

Prints invoices

Alerts user to customer exceeding credit limit.

Sales history reports.

Automatic updating of inventory daily.

Allows return credit memos

ACCOUNTS PAYABLE

Can post to 200 general ledger expense accounts per invoice.

Prints checks.

Automatically prepares payments. Supports partial and handwritten checks. Processes credit and debit memos.

Computes discounts and records discounts taken.

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Generates automatic payroll. Provides up to Bluser-defined rates. Allows post facto payroll.

Allows distribution of payroll expenses to userdefined departments.

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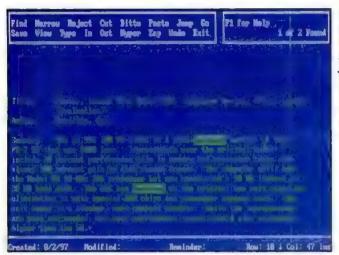


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■ PERSONAL INFORMATION MANAGERS



MemoryMate organizes random information and presents it through a familiar-looking database-style interface. The menu bar at the top of the screen is constantly visible.

from within whatever foreground application you are running when you hotkey into *MemoryMate*.

Actually, MemoryMate can run as a standalone application, but that deprives it of one of its main virtues—constant availability. Other PIMs, like Lotus's Agenda and Symantec's GrandView, aren't memory resident, so they demand that you drop whatever you are doing in order to use them. Persoft's IZE can be used in memory-resident mode, but it eats a whopping 300K RAM, compared with Memory-Mate's relatively dainty 88K RAM appetite. Under LIM 4.0 it can occupy as little as 30K of DOS memory.

When you hotkey into MemoryMate, you are presented with an uncluttered, two-part screen. The top of the screen is a constantly visible menu bar; tapping Esc activates the menu. To execute a command, you either point and shoot or you tap Ctrl and the first letter of the menu item.

The rest of the screen is a blank area where you can type whatever you want: phone numbers, a letter, or an outline of this afternoon's speech. When you finish, you save the record by selecting *Memory-Mate*'s Save command, and the program gives you a blank screen so that you can start another record.

Each time you save a record, Memory-Mate prompts you for a "reminder date" in mm-dd-yy format. When you hotkey into the program on a particular date, any records that have a matching reminder date automatically pop up. In this totally painless way, MemoryMate builds a tickler file. You don't have to specify a date for every record you enter, but this feature is invaluable for remembering appointments and due dates. And although the program could hardly be considered a project manager, you can construct a series of notes that remind you of where you should be in a project on a given date. Each note will pop up in sequence as you move through the subtasks of the project.

FRUITFUL SEARCHES Memory-Mate's search capabilities most clearly reveal its power. The program automatically indexes each word in a record. You use the Find command to search for a record by specifying any text string in the record, or by entering the date created or the reminder date. All records that contain the string or match the date pop up, and a status indicator in the upper right of the screen tells how many records have been found. You can step through these records by tapping the Plus or Minus keys on the numeric keypad, or use the Jump command to go directly to a specific record. If your search is too broad and finds more records than you want to pick through, the Narrow command initiates a more specific search of records already found.

Date searches are particularly useful, since you can immediately call up the records that pertain to a certain date. You can also use mathematical operators (=, <, >, and so on) to find all of the records cre-



ated before or after a specific date. One irritating limitation, however, is that the program lacks a simple way to pop up all of your records at once so you can browse through them. The only way to do this is to request all records created after an arbitrarily early date, like 1/1/11.

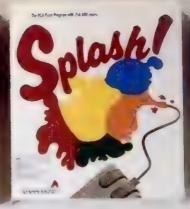
AND HYPERTEXT TOO A recent upgrade to MemoryMate adds one of the PC world's current buzzwords: hypertext. MemoryMate's Hyper command allows you to create links between different records, even if they reside in different databases. Placing a hypertext button is a simple menu-driven process, as is defining the record that the button jumps you to. Hypertext, combined with memory residency, makes for easy cross-referencing and also makes MemoryMate useful for generating customized help files.

Besides hypertext, MemoryMate has cut-and-paste capabilities and a clipboard. You can move information between records or between MemoryMate and your foreground application. The In and Out commands allow large files to be imported to MemoryMate or exported to the foreground application. Text files that aren't divided into records are imported as a series of contiguous records. Data that is divided into records of fixed length or delimited with special characters can also be imported.

A simple forms generator simplifies the creation of repetitive records like phone











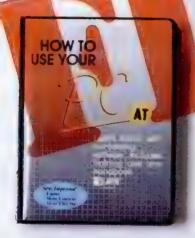


CON EPT

















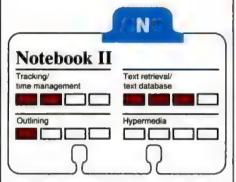


PERSONAL INFORMATION MANAGERS

message slips and memos. You create a master record that contains the form template and then copy it into the current record without affecting the master.

MemoryMate will help you organize the avalanche of information that piles up endlessly on your desk, but it won't require you to markedly change your work habits. Any reasonably experienced DOS user can master the program's most important features in a matter of minutes. It isn't as powerful as the more elaborate PIMs, but it may be all that you need.

—Jonathan Matzkin



pro/Tem Software advertises Notebook II in publications like The New York Review of Books and The Nation because it is trying to reach academics, the audience for whom the program was designed. Priced at \$189, this database program understands the needs of its users, furnishing them with a means to maintain bibliographic data and research notes. These two applications give the program its personality, which strikes a balance between obsessive and intuitive. That's because Notebook II offers enough structure to accommodate any form of bibliography, yet lets you enter text in a free-form manner. The result is that a record can consist of one unnamed field that's 50K long.

Like any database program, Notebook II uses files, records, and fields. But unlike a lot of these programs, the amount of data in a field may vary because text entries are not limited by a predefined length and can wrap around from line to line.

Field names, or headings, are listed in a column down the left side of the screen. You can assign up to 22 characters of space to this column, which is separated from the fields themselves. This marks the

Isk polishes the PS 2 line, adds nodel 70, and enhances model 58. (First Looks)

Venditto, Gus

IBM does not regain its position as technology leader with its new additions to its PS-2 line; Compaq with its Deskpro 386 of Sept 1986 has claimed that. But the company has filled gaps in the PS-2 line; an enhanced Model 58 - the 582 - that has faster RMM, zero wait state, and more responsive and larger hard disk; a series of Model 78s that are 386-based units housed in Model 58 sized cases. The three 78s offer 16, 28, and 25 MHz respectively with the latter having a 64N nemory cache and Intel 8235 cache controller to further speed perfornance. IBM also is adding a \$2,395 scanner with 388 dot-per-inch resolution. Selected price cuts will occur to existing computers in the PS-2 line.

International Business Machines Corp. manufacturers.

Beginning SMA Find Goto Heading Silver Country and Silver Country Country

In a Notebook II record, the field names run down the left side of the screen. On the right side are the actual text fields. The edit menu is revealed under the text when you press the Esc key.

end of your ability to design a record layout and the beginning of the obsessive side of *Notebook II*—order to a fault. Although this layout works well for bibliographies, it is restrictive for other applications. For example, you can't have fields alongside one another, as you might want in a typical inventory record or invoice. And you can't store spreadsheet data in a row-and-column format.

If you don't want a structured database, the intuitive side of *Notebook II* can cope. The program lets you create a file with records that have no named fields. Then, by eliminating the heading column, you end up with records that are one field—a blank screen 74 characters wide—that can hold up to 50K of text.

An unstructured record could hold a random piece of data or news, an idea for a project, or a reminder, all of which are unrelated to items in the other records. Yet you can tie records together at any time by creating a view of your database file.

Every time you change a record, *Note-book II* creates and stores another copy of that record—although you see only the latest version. Even deleted records are only marked "Deleted"; they are not actually removed from the disk. Because the program works this way, you'll find that your files will grow in size very rapidly.

CREATING VIEWS Notebook II's dexterous ability to create views makes it well suited to managing many types of personal information. The most powerful way to

create a view is to use the Select function, one of ten choices that appear on a pop-up menu at the bottom of the screen. The Select function lets you search your file and link records by a word, phrase, date, or any string of up to 20 characters.

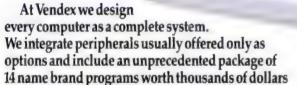
From the Select screen you can choose a field or the entire record as the search criterion. Then you pick the search condition: Contains, Excludes, Begins With, NOT Begins With, Less Than, and so on. After that, you enter the text to be searched for and a Boolean AND or OR condition. You can set only two conditions at once, which slows searches down a bit. But by repeating the Select procedure, you continue to refine a view with as many conditions as you want. Alternatively, views might be merged to broaden a selection.

Views are stored as part of a file. It would be great if you could toggle back and forth between a view and the full database, but it takes a number of keystrokes to navigate that leap. Fortunately, you can edit records while in a view; however, you can't add records.

Another way to create a view is by picking individual records that may have no common text. You can browse through your database and select records one by one with the View/Add command.

A Reorder command also creates views. These views contain all the database records arranged in a new way. For example, if you have a bibliography organized alphabetically by author, you could use Reorder to sort it by the date published.





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mouse, joystick
EXPANSION SLOTS: 3 available
MOUSE: Standard
SOFTWARE: DOS 3.3, GW Basic, HeadStart

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With Tornado, you process information in stacks of superfast "intelligent" windows—several on your screen at once. You type into the windows; interconnect and prioritize them; and scan through them in remarkable ways.

Free Form

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■ Countless Uses

There are thousands of uses for Tornado. When Harry calls you on the phone, in two seconds flat you'll display the six windows on Harry before he finishes his first sentence! No more embarrassing pauses or scrambling for information. Tornado is so versatile you can write and print a letter faster than ever; track things to do; edit electronic mail; and plan a project or eventquickly and easily. You can even build a sophisticated "knowledge" base or an unstructured data base without programming. And that's not all. Track phone conversations, numbers, customers, and all your other RANDOM information. On a

portable, Tornado is your ideal moving office. Best of all, you tailor Tornado to your own needs—easily!

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"Excellent Excellent Excellent Excellent" PC World, Patrick Marshall

"one of the niftiest ... programs I've ever seen B) 11, Jerry Pournelle

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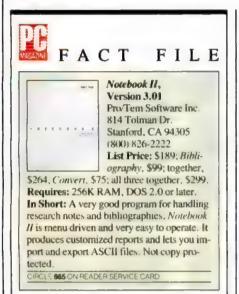
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You can also use the Reorder command to change the original database without making a separate view, or to change the order within an existing view.

The one unfortunate aspect of the view function is that views are deleted when you compact the database to shrink the size of your files and improve the search speed.

NON-BOOLEAN SEARCHES Notebook II lets you conduct simple, non-Boolean searches with the Find function. You match a word or phrase to text in a particular field. Find also works on the record as a whole. It will operate either forward or backward through the database from whatever record you're viewing. Once the first match is found, the Shift-F4 combination will bring up succeeding matches.

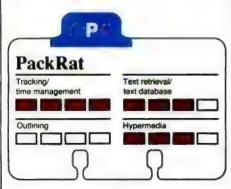
Notebook II has a relatively flexible report writer. You can print files to the screen, disk, or printer exactly as they appear in the database. Or you can customize the format of a report by placing selected field data anywhere you want on a page, adding headers and footers, and entering text to the body of the report that will be repeated on every record. Although the program doesn't offer many printing enhancements, it does let you underline text, justify text within a column area, print out the record number on each record, and indent text lines.

Should you want to edit your database files using your favorite word processor, Notebook II lets you export ASCII records or entire ASCII files. Exported files still contain field names and the vertical bar that separates the heading column from the fields. The program can import only ASCII files or comma-delimited files. Imported files have to be formatted in a particular way, and there can't be any colons in the text or in your field headings. I made the mistake of using a colon in my field heading, and a short letter I tried to import was broken up into 33 records.

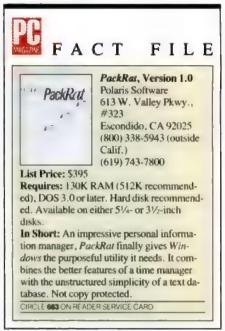
MASS APPEAL. To buttress the appeal of Notebook II as a manager of bibliographies, Pro/Tem offers two companion programs: Bibliography and Convert. Bibliography constructs a bibliography based on a comparison between citations in a manuscript and Notebook entries. It costs \$99 independently or adds \$75 to the cost of Notebook II. Convert takes information (usually book and article citations) from Dialog, BRS, and Medline on-line databases and puts it into Notebook format for importing. This option costs \$75 or adds \$35 to the combined cost of Notebook and Bibliography.

Notebook II has its faults. Its structure can limit the way you design a record—unless you eliminate fields altogether. And you can't search across database files, use spreadsheets, or preserve views after the database is compacted. But the program has enough flexibility, and its searching methods are thorough enough, to make it useful for many personal information management applications.

-Henry Fersko-Weiss



If Windows has a failing, it's that Microsoft built in too many free utilities and applications. For example, if you need to

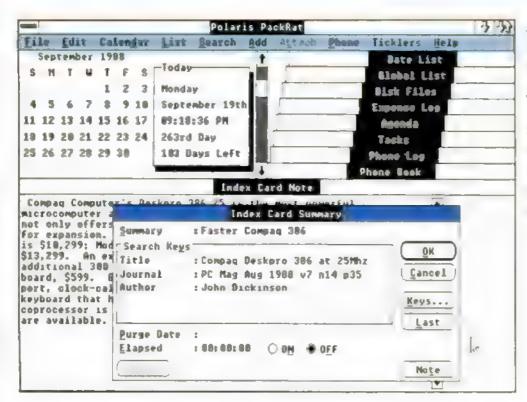


jot down appointments, reminders, to-do lists, or random notes to yourself, there's a way to do it in *Windows*, primitive as that method might be. It is Polaris Software's hope that *PackRat*, its \$395 personal information manager, will entice you to forgo *Windows*' rudimentary procedures for a new set of better-integrated, more-sophisticated tools.

The Microsoft Windows installation software is among the simplest to use. And Microsoft allows software vendors like Polaris to use it as the installation procedure for their own Windows applications. If you know where you want to install the software, whether you'll be using a mouse, what printer you have and how it's connected, and what video display system you're using, then you can install PackRat in as little time as it takes for the installation program to copy the files to your hard disk

If you're not already using Windows, don't assume you'll have to discount Pack-Rat: Polaris supplies a Windows/286 runtime module that will encase its software in a Windows shell. (On machines slower than the typical 8-MHz 286, you'll find that PackRat and Windows run in what seems like slow motion.) I installed the package under Windows 2.0 and Windows/386 without incident.

■ PERSONAL INFORMATION MANAGERS



A PackRat index card entry can be as small or as large as you'd like it to be—as long as it's less than 32,000 characters long. Field names can be customized to reflect the card's content.

CALLING ALL PACKRATS Windows itself comes with a clock, a calendar, a notepad, and an index card file. Unless you do some manual labor, these utilities are disjointed, working independently of one another. PackRat brings these features and more into a cohesive group of seven "facilities" that are interrelated (and, at times, interdependent) text and graphic databases. Originally two separate programs but now united under Windows, PackRat takes care of phone book and phone log chores, agenda and task tracking, expense logging, index card filing, and the onerous duty of cataloging disk files.

With no real phone-logging system, I have spent the better part of the last 2 years entering names, addresses, and phone numbers in a Windows card file. It will hook to an auto-dialer, and with Windows' notepad beside me, I could jot down notes as the need arose. With PackRat I just click the name of the person whose number I want to dial; *PackRat* does the dialing through my dialer, starts a time log, and leaves me a broad expanse of white space in which I can do all of the doodling I want. The only drawback is that PackRat cannot import my Windows files directly because it knows ASCII and Windows does not.

PackRat's phone log system is a consultant's dream come true. While the system won't calculate a fee based on the time you've spent on the phone, it does provide ample space for recording details of conversations as well as offering automatic date, time, and number stamping. Well, you can have *almost* everything.

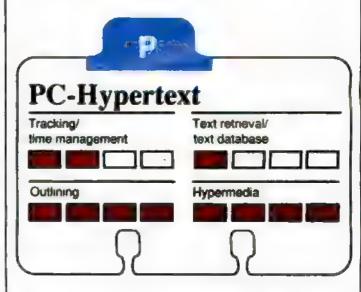
BEST OF BOTH WORLDS PackRat's index card system is phenomenal in its class, combining the better elements of a free-form keyword-searchable text database with those of a structured field-oriented data file. Up to 32,000 characters can be stored on any card. The card is then addressable by up to eight keywords if you use the default text database format, or by specifying the field search criteria based on the contents of up to eight data fields that you've created using the Custom Labels option.

You can, optionally, apply your custom file labels to all of the index cards you'll be using or just to the individual card you're currently filling out. You can create a catalog of these custom labels and have several different field structures (or no field structures at all) included within one card file. When you've entered the field data or keywords (either of which is actually a list of possible recall parameters and not the true contents of the card), you then have a 32,000-character index card that you can fill with the data of your choice. It can be text or graphics; *PackRat* doesn't care.

A BIT BEWILDERING I found Pack-Rat's concept of agendas and tasks a bit bewildering at first because I assumed that a task would have a subordinate position to an agenda. PackRat, however, treats them as separate entities and places slightly more emphasis on time tracking for agendas than for tasks. You handle tasks in the same manner as you might organize a small-scale project-management time line—with attachments and dependencies that are assignable to people found in the phone book or to other tasks that must precede them. Agendas emphasize starting times, such as the time a meeting should begin, and may be assigned to people.

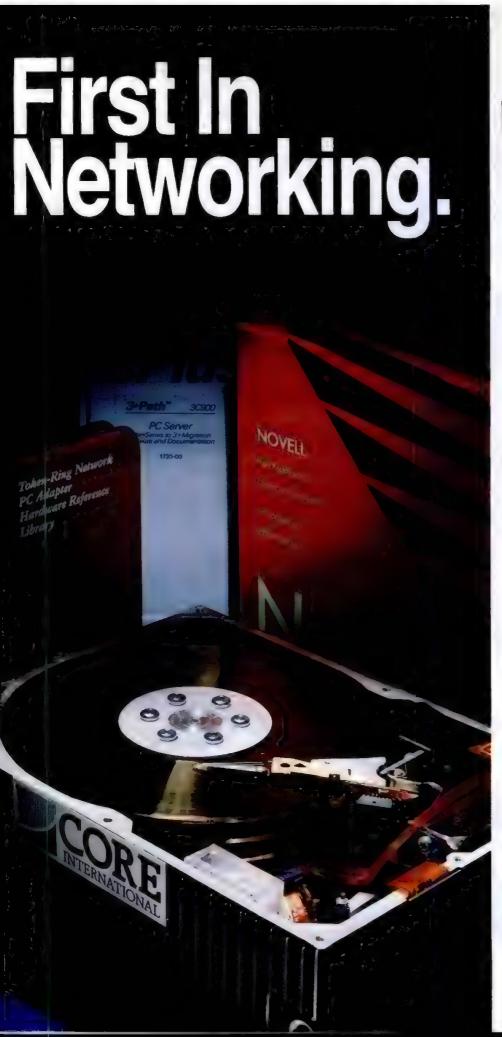
There are other small annoyances. PackRat's phone book limits you to using at most 30 characters for personal and company names, which isn't a major flaw-it's just irksome. In fact, the only unbearable portion of the entire program is the calendar display. While I am pleased to know the current day and date, and to know what chronological day of the year it is, I am troubled that there are, as of this writing, only 103 days left (until the end of the year, of course, but the program never tells you that). I can't help wondering what will happen when there are no days left at all. These minor points aside, PackRat is the personal information manager of choice for Windows users.

-Bill O'Brien



In the world of hypertext and PIM architectures, PC-Hypertext, from Max-Think, more closely resembles a carpenter's gothic than a Frank Lloyd Wright design. That's because PC-Hypertext is a system that you build yourself out of three separate MaxThink products: MaxThink, Houdini, and HyperLink. Whichever combination of pieces you use, the system you end up with can be as eccentric as you wish to make it.

MaxThink, an \$89 outline processor, is the easiest of the three building blocks to



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■ PERSONAL INFORMATION MANAGERS



This sample hypertext system, developed using MaxThink, Houdini. HyperLink, and PC-Hypertext, shows the current topic level and the available choices, including topic titles and specific articles. If you select one of the articles, the program will call up and display the file named in the brackets.

describe. But it's an outline processor in the same way that a 25-MHz 386 machine is a fast calculator-both do so much more. MaxThink lets you create, edit, and print outlines, move blocks of text up and down levels, and about a hundred and one other things.

For example, MaxThink offers you a series of "brainstorm" commands, which allow you to sort topics, put them in priority sequence, or randomly scramble them again so that you can take a fresh look. You can even perform a binsort, which lets you set up heading topics as "bins" and then rapidly assigns each topic in a list to the appropriate category.

MaxThink also has a REF command, which builds an alphabetized list of every word in the outline. You can enter a reference to an ASCII or PC Paint or PC Paintbrush file, for example, and display it from within your outline. There are facilities that let you quickly load disk directory information into a MaxThink file so that you can manage your disk files better. With all these features, plus multiple screens of configuration options and a strong kevstroke-macro-recording facility, Max-Think is a tough program to outgrow.

MORE MAGIC Houdini (\$89) is a little more difficult to describe. Whereas MaxThink creates information outlines composed of topics, Houdini creates knowledge networks composed of nodes.

A typical Houdini application might involve mapping the relationships between case law and deposition statements, or dumping in sketchy details about characters, plot lines, and settings and then exploring different combinations and interactions.

A Houdini network can be as simple as a hierarchical outline, but it can also be much more complex. Information elements, or nodes, can relate to one another in any of five different ways based on how their connections are structured. Since these structures can be interconnected, you can create elaborate and extensive information networks. If this sounds as if it might be difficult to execute, it is. Don't expect to master Houdini in one afternoon.

Fortunately, Houdini uses many of the same commands and user-interface design elements as MaxThink, including the ability to display the contents of ASCII, PC Paint, and PC Paintbrush files. There are a number of ways that you can view the nodes and their relationships.

THE FINAL LINK HyperLink is not so much a single product as it is a combination of related utilities. This \$89 module has programs that let you move MaxThink and Houdini networks into hypertext networks. Since the PC-Hypertext system is designed to connect separate files, Hyper-Link has a utility that automatically divides a large text file into many smaller ones. Another program creates cross-reference lists for each file and then combines them into one long list.

HyperLink also includes an ENCODE

program, which compiles text files into a hypertext system that can be used with PC-Hypertext. All jumps are established by placing a filename between the left and right angle brackets. The files used by EN-CODE can be created with any editor capable of writing ASCII files. HyperLink even includes a utility designed to make a mini-expert system out of a hypertext network.

Once you have put all your links in place and then compiled the results with ENCODE, you view the results with PC-Hypertext, MaxThink's \$5.95 runtime program. PC-Hypertext is so simple to use that its documentation consists of only a single screen. You can navigate throughout the entire knowledge system using just four arrow keys. Best of all, because there are no licensing fees for this program, you can use it to distribute hypertext systems that you've created with HyperLink.

PC-HYPERTEXT AT WORK How well do these programs work? In testing all three, I created a hypertext system using a sample data file containing abstracts of PC Magazine articles. First I inserted the tokens required by the file-separating program (a description and a unique filename) into the sample file then used the Hyper-





PC-Hypertext MaxThink 44 Rincon Kensington, CA 94707 (415) 428-0104 List Price: \$5.95; Houdini, \$89; MaxThink, \$89; HyperLink, \$89;

demo program and tutorial cassette, \$10 per program.

Requires: 256K RAM, hard disk, monochrome or CGA monitor, DOS 2.0 or later. In Short: Powerful, separate collections of programs and useful utilities, this set of products can turn files of ASCII text information into outlines, knowledge networks, and hypertext systems with relative ease and extraordinary speed. You'll want a good text editor to go along with some of them, but overall they offer excellent value and capabilities. Not copy protected. CIRCLE 679 ON READER SERVICE CARD

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Link utility to split the text into 53 files.

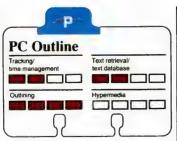
The file-splitting process also produced a full list of the file descriptions and names in a form that could be entered as a MaxThink outline. Next I edited that outline, sorting the topics into First Looks, Hardware, Software, and Columns and then grouped some of the articles into categories. At this point I could have moved this list into Houdini and developed morecomplex relationships, such as linking articles by the same author or relating articles that discuss performance tests.

Instead I chose to create some of those links by using my favorite editor to insert the desired filenames in brackets. I then converted the *MaxThink* file into the hypertext network format, compiled it, and was able to use the resulting system immediately. It was not a particularly complex system, to be sure, but it took less than 2 hours to create a useful application.

BUT IS IT A PIM? In the end I would be hesitant to think of a hypertext knowledge system as a personal information manager, simply because the effort required to create a complete system is inordinately large for the result. If you are familiar enough with your information to be able to devise all the interconnections you'll need, you could achieve similar results just by using Houdini.

HyperLink and PC-Hypertext shine as end-user reference engines that you can load quickly and easily. MaxThink is a tremendously helpful, multipurpose personal-information-management tool that can be used for such wide-ranging tasks as creating to-do lists, problem-solving, and managing your hard disk.

All three programs have essentially the same user interface, and all work with straight ASCII text files; the same commands are available in more than one program. Together they represent an outstanding value, costing less than some other products reviewed in this issue. If you need to organize your own information, or if you need to understand the interrelations between elements in a large collection of items, or if you need to create powerful reference works that others can use to learn about complex subjects, then you should consider one or all of these programs.—Alfred Poor



Prown Bag Software's PC Outline is so powerful and flexible that it may feel as if you have five programs rather than one. Not only is the \$89.95 program an excellent outliner; it is also a simple project manager, time manager, database manager, and word processor. What's more, you can see these application files at the same time by opening PC Outline's nine windows. All this functionality is encased in a program that is easy to use, has a very appealing look, and can be run in a RAM-resident mode.

You access PC Outline's program functions through pull-down menus; some menu choices lead to option boxes. The program offers you a number of ways to access menus: by using the Ins key and then scrolling across the menu bar with the arrow keys; by using the Slash key followed by the first letter of the menu title; or by using the Alt key in combination with the first letter of the menu title. This kind of diversity exists in every aspect of PC Outline's operation.

You can invoke menu functions by scrolling or using the first letter of the command; often you can use shortcut keys to bypass the menus. Shortcut keys are listed on the menus alongside their respective functions, making them easy to learn as you use the program. PC Outline is also able to redefine keys as macros, allowing you to repeat common outline elements and their subelements or invoke templates.

CREATING OUTLINES When you select Create New Outline Entry option or Ctrl-N or Ctrl-Enter from the Outline menu, PC Outline automatically assigns outline numbers as you type in your text. The default numbering system places capital letters next to top-level headlines, but you can easily change the style to Roman

numerals as well as use Roman numerals at any other level. In addition, you can use lowercase letters and cardinal numbers with sublevels. You can specify the numbering system you want for up to eight levels of text. Then, too, you might decide that you really don't want to number your text entries after all. *PC Outline* offers you several ways to eliminate outline marks after they have been recorded.

The program also lets you add explanatory text to your outline at any point by simply pressing the Return key to start a new line. You can use a battery of blockediting and formatting commands to adjust individual outline elements, families of elements, and free-form text. And as you would expect, when you issue move commands to reorder your outline, the whole outline is renumbered to reflect those changes.

One of the big advantages of using a computerized outliner is that you can hide sublevels and show only summary entries, thus focusing your reader's attention on the major or unconfidential points of your outline. You can always open up the portions you or your reader wants to see in detail. In this, *PC Outline* gives you great flexibility, allowing you to hide and show individual elements, levels, or text. The gray Plus key toggles back and forth between hiding and showing elements.



■ PERSONAL INFORMATION MANAGERS



Cutting and pasting information between files is very simple with PC Outline. In the screen shown here, two of the windows have pieces of the same file while a third shows part of another file. The software can display up to nine windows at once, but only one is active at a time.

A MANAGER'S TOOL Because outlines provide a systematic way of defining and summarizing relationships among items, their application extends beyond such obvious uses as to-do lists, phone and address lists, notetaking, and the like. They can be used as simplified substitutes for some common standalone applications, such as project management, time management, and database management. In fact, the best low-end project management programs are now incorporating outline views into their methodologies.

PC Outline makes a noble attempt to act in each of these capacities. As a rudimentary database manager, the program allows you to enter secondary fields of information as part of an outline entry. So, for example, you could set up a customer list with secondary fields for last contact date and the number of the promotional letters a contact received. You could then sort the file by either of these fields to determine when or how you should recontact your customers. All the while you'll be reaping the benefits of the program's outline format because you'll have maintained detailed free-form notes about your dealings with each customer.

But there is one annoying glitch in this process. If you have titles in your file, the sorting routine puts the title line at the bottom of the list. Then you have to go through several steps to neaten the file after a sort. If you have more than one line of titles, this process becomes even more complex and time-consuming.

Setting up columnar fields is the key to using *PC Outline* as a project or time manager. For project management you could set up fields for the name of a task, its duration, due date, the person responsible for the task, the resources involved, and the cost. Subtasks would be listed under main tasks, indicating dependent relationships. Explanatory text could follow the fields.

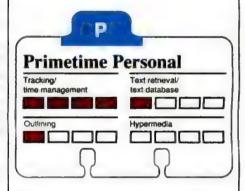
If you manage more than one project, you would have a separate file for each one. Then when you wanted to get an overall picture of your projects, you would load your project files into the program's windows and look at as many as nine projects at once. By opening all these windows, you can easily compare dates and resource usage, as well as transfer data from one file to another. You can't do time calculations or display a Gantt chart of your project, but simple projects—particularly personal ones—don't really require much more sophisticated maneuvering than *PC Outline* is capable of.

Having as many as nine windows open at once could get confusing if it weren't for PC Outline's List Windows function, which tells you the names of the files by window number, their size, and whether there have been any unsaved changes made to them. You can size and place windows on the screen as you like.

PLUS AND MINUS A crucial part of many applications is searching your files to isolate individual elements or groups of elements that satisfy certain conditions.

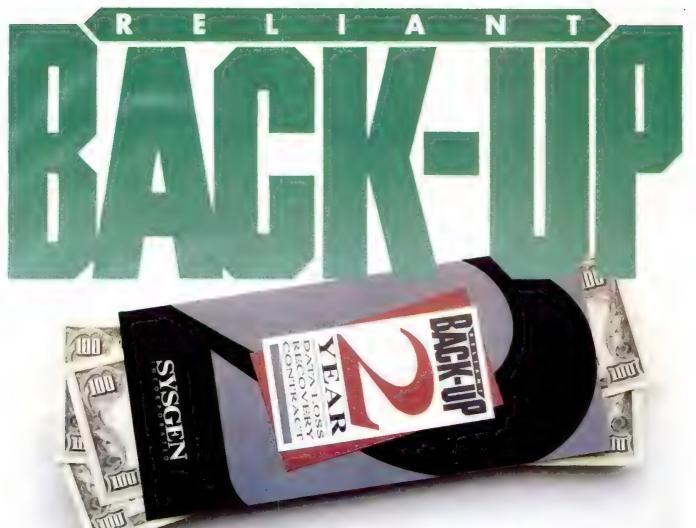
PC Outline is adept at conducting a traditional search using a string of text. If you are managing a project, you might use the find and replace commands to update tasks, searching for "Still Waiting" and replacing it with "Done" for completed tasks. Searches are performed either on visible entries only or on every entry in the file, even the hidden ones. But PC Outline cannot conduct a conditional or Boolean search, which is important for almost any database application. That is a major weakness of the program.

A new version of PC Outline, called PC Outline Plus, is due to be available before the end of the year. Priced at \$95, it will contain the Merriam-Webster dictionary and thesaurus. It will also give you the ability to use different sets of editing commands that match the commands in several popular programs, including Microsoft Word, WordStar, WordPerfect. and MultiMate. PC Outline Plus will let you control the fonts and colors used on the screen and will have context-sensitive help. These new features will make it easier and more comfortable to use what is already a very easy and powerful program.—Henry Fersko-Weiss



Primetime Software has chosen to concentrate on a limited area of information management and give it a solid treatment. The result is *Primetime Personal*, a time-management program that elevates the appointment calendar and to-do list to a fairly high level of sophistication. The \$99.95 program lets you do anything from jotting down a reminder or an appointment to scheduling start and due dates for a number of delegated assignments, all with a minimum of effort.

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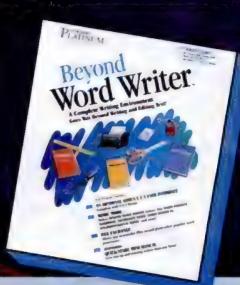
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Primetime
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screen shows you
tasks in order of
priority and
classification and
displays the number
of days left until a task
is due. Strikethroughs indicate
completed tasks.

database structure rather than the sort of free-form approach taken by programs such as Agenda. This means you have to call up the module in which you want to store information and enter it as a record by filling in the appropriate fields. Still, the program's intuitive design makes using it almost as easy as grabbing a pencil and a notepad.

The main menu and a calendar are always displayed in the top portion of your screen, while the screen of the module you're currently in occupies the rest. Speed keys switch you from one module to another readily, and a function-key menu at the bottom shows all the options available within each module.

CHECKING YOUR SCHEDULE An appointment module and a task module constitute the core of the program. When you call up the appointment screen, you're presented with a facsimile of a page from an appointment book showing your schedule for the current date with the current time slot highlighted. An N to the right of an entry means there's a note attached to it, which you can read by hitting F4. The size of the time slots defaults to half an hour, but you can change this size to whatever you want. The program even accommodates appointment times that don't fall on a regular dividing unit (such as 3:37), and it lets you schedule concurrent or overlapping appointments.

An alarm reminds you of particularly important engagements; you can control

both the duration of the alarm and the amount of lead time it gives you. This feature, of course, is practical only in *Primetime Personal*'s memory-resident mode. But since the program consumes 120K of RAM as a TSR, you may think twice about making it a permanent resident in your PC's memory.

You can flip to other days by means of the calendar at the top of the screen—one of the program's nicest features. The cursor keys, plus PgUp and PgDn in conjunction with the Shift key, move a highlight from the current date to any other on the calendar. When you release the Shift key, you're presented with the schedule for the date you've selected. Shift-Home moves you back to today's date.

Calling up the task screen shows you today's to-do list. When you enter a new task, it normally appears immediately on your to-do list and stays there until you remove it. You can also enter forthcoming tasks to be automatically added to the list at a later date. If you specify a due date for a task, the to-do list will also show the number of days left until the deadline. The onscreen calendar facilitates dating an entry by automatically filling a field with the date you've highlighted on it. Another neat touch lets you enter date abbreviations such as "2w" for "2 weeks from now."

SETTING PRIORITIES You can prioritize tasks and categorize them, but category labels can consist of only a single letter. *Primetime Personal* also lacks the ability

that Agenda and GrandView have to categorize items automatically according to their content. On the to-do list, Primetime Personal can display tasks in order of priority, category, or due date. Although each item can be no more than 50 characters long, Primetime lets you attach fiveline notes to each item.

One of *Primetime*'s strongest features is its automatic task- and appointment-generating facility. Suppose you want to schedule a meeting for 3 P.M. on the second Wednesday of every month or add a reminder to your to-do list to water your office plants every 4 days. You need make just a single entry, and the program will automatically add the remaining entries to your appointment schedule or to-do list as far into the future as you specify.

Another option gives you some elementary project management power. You can delegate tasks already on your to-do list or assign new tasks to other people. Simply adding a person's initials to the assignment-code field of a task will mark it as an assignment. It will then not show up on your to-do list until the date you set for reviewing the assignment.

Before assigning a task, you must add the name and initials of the assignee to the phone book file. This lets the program automatically expand the person's initials into his or her full name when it displays assignment details. Of course, the phone



FACT FILE



Primetime Personal, Version 1.23 Primetime Software Inc. P.O. Box 27967 Santa Ana, CA 92799-7967 (800) 777-8860 (outside

(714) 556-6523 List Price: \$99.95

Requires: 120K RAM, DOS 2.0 or later. In Short: A well-designed tool for handling appointment schedules and to-do lists with a minimum of effort, *Primetime Personal* lets you keep track of tasks you've assigned to others and includes a phone book. Not copy protected.

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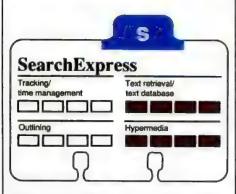
PERSONAL INFORMATION MANAGERS

book also lets you store phone numbers, addresses, and notes for each entry and allows you to search the list by name. There's an auto-dial feature as well.

To get a list of all the tasks you've assigned—either under way or not yet started, or both—you use *Primetime's* reporting facility, which includes all starting and due dates in its output. The report generator will also list all your own forthcoming tasks and appointments or will catalog all completed tasks and assignments. You can send the report to the screen, to disk, or to the printer.

Primetime Personal offers a solid, straightforward approach to time management. The flexible, intuitive interface shows that the vendor has given a lot of thought to how people will actually use each feature. What the package lacks in sophisticated text-retrieval capability, it makes up for in ease of use and low price. For someone who wants to keep organized but doesn't have room on his to-do list for digesting complex software, Primetime Personal may be just the ticket.

-Robert Kendall



Executive Technologies' SearchExpress was an early entry into the text retrieval market and one of the first PC programs to offer hypertext, linking text with graphics images, scanned documents, and other objects. The powerful search facilities of this \$349 program best serve those who need to manage collections of data from a variety of sources.

SearchExpress's documentation consists of a small spiral-bound booklet that lacks the sophistication of the product itself. Details for using the search facility are clear, but a tutorial on searching is scanty and does not exploit the possibilities



SearchExpress word searches yield documents with the target words highlighted. A zoom key takes you to either complete text, significant paragraphs only (shown here), or significant sentences only.

of the sample documents included. Sections on setting up a user menu to execute external programs, particularly important for users of nontext data, are just adequate. The manual's explanations for hypertext linking are not thorough, especially for someone new to the concept.

The overall organization of the manual, with front-end addenda for the latest version, is confusing. Fortunately, Executive Technologies' technical support staff is responsive and helpful, overcoming most of the documentation's faults.

SearchExpress works with any sort of data—text, images, spreadsheets, graphics, even digitized sound—and handles input from most popular word processors, including WordPerfect, MultiMate, and Microsoft Word. I used the program with files from several packages and had difficulty working with only one double-column XyWrite file. Other XyWrite documents posed no problems.

As each object or document is incorporated into the system, SearchExpress stores a header for it. Case-law text might need headers that include judge, date, court, and counsel and caption, and image headers might need source, colors, and subject. This information can come from any of three sources: user entry, embedded text, or computer-generated defaults. User-created templates can include header-entry guidelines for objects as well. You'll find that entering documents and headers is tedious and sometimes time-consuming, but you'll be paid back with

speedy retrievals later on.

As you enter nontext items and set up header information, it is crucial to anticipate potential retrieval requests. Planning header definitions for textual items is less important because retrieval can be based on an index of an item's content, and because the program offers extensive search parameters.

FROM SIMPLE TO COMPLEX The simplest type of search you can conduct is a word search, with particular words specified as required or not. You may also assign a weight to any word, designating its importance. The result of such a search is a list of the relevant documents ranked in order of importance as determined by the assigned weights. Words are identified by root, so treaty and treaties, for example, are equivalent search words. There is no specific wildcard character, but root indexing creates a sort of automatic wildcard that is consistent with word meanings.

Advanced searches are accomplished through Boolean combinations and can be quite complex. Each of up to nine search requests may incorporate not only the familiar AND, OR, and NOT connectors but also commands designating adjacent to, in the same sentence, and in the same paragraph. Header fields may be searched and previous search request lines stacked and recombined in later requests.

The most unusual retrieval option offered by SearchExpress is the search for a similar document. This feature actually



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analyzes the words found in a group of user-identified documents and retrieves a specified number of other documents that use similar words, ranked in order of similarity.

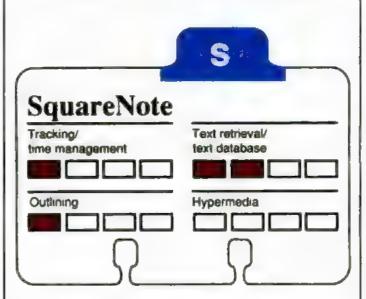
VIEWINGA DOCUMENT You can follow any of these searches with an examination of the retrieved documents. You can zoom in on relevant portions of a document by using a function key, and the Read menu lets you choose among several sorting and output options.

Access to nontext or external word-processing documents is actually controlled by the external application program. You enter an external application program through a pull-down user menu, which you configure to call up to 16 programs of your choice. This feature works best with programs that accept filenames as parameters issued from the command line. However, I was able to access Lotus 1-2-3 spreadsheets using this technique only after receiving special programming help from Executive Technologies' technical support staff.

Another way to retrieve documents or images is through direct linking. The hypertext function automatically adds linked objects to a retrieval set. Used creatively, linking could even produce an approximation of a diagnostic tree search, narrowing options and moving through linked documents.

HERE'S THE RUB All this flexibility takes its toll primarily in space. The program occupies about 450K RAM, although it shrinks back to 20K when running external application programs. In addition, text documents stored in Search-Express may require another 50 to 70 percent of disk space beyond their original size to accommodate index overhead. Moreover, during the add-documents process, disk space of up to ten times the size of the original files is used as temporary workspace. Users who run RAM-resident programs and also wish to run external programs through SearchExpress should contact the vendor's technical support staff to find the least problematic way in which to do so.

SearchExpress is not a program for novices or casual users. However, its ability to handle up to a million files of various types, its malleability, and the speed and power of its searches are all impressive. Beyond this, Executive Technologies is committed to upgrading the product, promising not only performance improvement but also such goodies as a notepad feature and a thesaurus to permit searches by meaning as well as spelling. For those who need a librarian extraordinaire, SearchExpress fills the bill.—Joy Segall



Lis like peering into a file box of index cards. That's because managing the kind of odd bits of information you might write on index cards—nothing more, nothing less—is the mission of this \$99 program from UnionSquareware.

On closer inspection, you can see the tops of a series of cards, fanned out to reveal the first three lines of the note. The top line, acting like a tab, displays subject la-



bels. You can sort the notes into stacks by selecting a series of subjects using combinations of AND/OR conditions. You leaf through the file box by scrolling up or down the screen with the arrow keys. It is a simple, straightforward approach to managing personal information. The simplicity and the index card metaphor are in its favor, but the lack of structure within the notes can make the entry of often-repeated data tedious.

SquareNote's opening screen offers four options: Get or Create a note file, change the Dirpath, or Quit. If you're creating a new note file, you have the choice of importing information or writing notes. Imported notes must be in ASCII format and must begin with a validity string of characters: \$\$<IMPORT>\$\$. Other character symbols are used to indicate the subject keyword area, the record body, and its end.

Notes can hold up to 500 lines of information in what is essentially one long field. You enter data in free-form fashion, which is both an advantage and a disadvantage. On the one hand, you don't have to worry about field sizes. On the other, if you want your fields to have some structure, you have to re-create that structure on each record.

At the top of each blank note screen is space for entering the note's subject keywords. Each blank note has the word Unclassified written in as the first subject. It is replaced when the first specific subject is entered. Each note record can have up to

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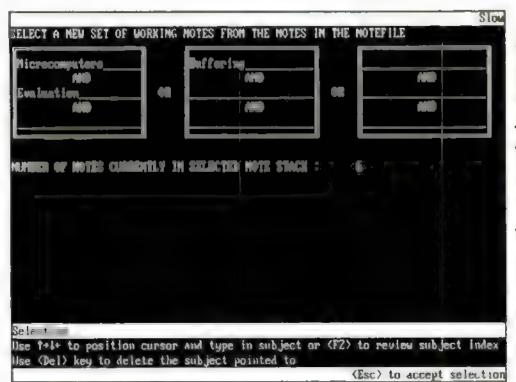
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Browsing through your files is very easy with SquareNote because it shows the top three lines of up to five note records. The first line of each note contains the subject keywords under which the note is filed.

100 subject keywords—quite sufficient for the most detailed categorization of data.

SPLITTING NOTES You can split a note at any point to create another field, but two text fields are the most you get. SquareNote's developers call this split a perf, for perforation. Text above the perf is called the header; below it is the body. Although in practice header and body text are not treated differently, it does help to use the two areas consistently to speed searches and export routines. For example, you might keep the names and addresses of your customers in the header and comments on your sales leads in the body. Then you could quickly export only the name and address list, or search through the body of the note.

After you've written and saved a note, you'll see SquareNote's main menuscreen, which displays the first line of keywords and the first two lines of text for five note cards. A status line at the top of the screen tells you the name of your note file and the number of notes in it.

Being able to glimpse the first few lines of information on the index cards helps you browse through a file. But if you want to search more rigorously for a particular note, or a group of notes that contain a piece of text, you can do so by using the Ctrl/PgUp and Ctrl/PgDn combinations. SquareNote prompts you for a string of text not longer than 20 characters. This search routine will bring you to the next note in the file that contains the text you are

looking for. Alternatively, it will gather all the notes with that text and put them in the front of the file.

SquareNote also lets you search by keyword. You enter subject names in an entry box that can hold three subjects connected by AND. Only notes with all the subjects in the keyword area will be selected. There are three such entry boxes, connected by OR conditions. This lets you look for files that may have one or another subject keyword or group of keywords. When the procedure is finished, the group of selected notes is put together in a stack. This stack then becomes your active set of notes.

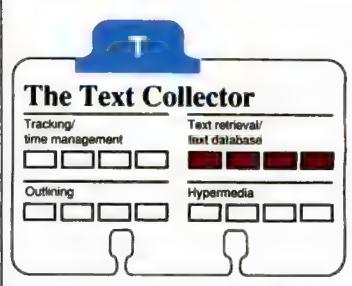
STACK EM UP Other keyword commands let you expand the stack, keep only certain notes in the stack, or discard notes. In this way you improve your search. For example, you could build a stack of customer information by first selecting all the notes with New York and Credit in the subject area and then refining the selection by keeping only the notes with Volume Buyer as a subject and discarding those with Revenues Down.

If you have a stack that you want to return to again without having to conduct a complex search, you use the Subject command. This command lets you add a subject name automatically to every note in the stack. Then you can run a select routine on that one subject name to re-create the stack later.

SquareNote's sorting facilities are fair-

ly limited. Because there are no formal fields to speak of and the notes aren't numbered, there isn't much material for a sort command to work with. But you can do an alphabetical sort based on the characters in the first line of text—all 72 of them if you want. A second option is sorting by ZIP code. You enter ZIP codes in the header area of your cards and then sort the file accordingly.

When you print notes from Square-Note, you can control page headers, page length, line spacing, and line margins, as well as other basic formatting parameters. That is the extent to which you can customize a report—a limitation that reflects the program's narrow focus. If all you want to do is manage the kind of mixed information you might keep on index cards, then SquareNote should do the job. But don't try to use the program for applications that require more-formal data management techniques and customized reporting.—Henry Fersko-Weiss



Quick, where'd I leave those references to the merger talks? I've got to run to a meeting, and I need every scrap of information I've stored on-disk immediately."

Hmmm. Sounds like a job for *The Text Collector*, a \$69 program (with a 30-day unconditional money-back guarantee) that's geared up for quick operation, making it exceptionally convenient to change search and output parameters.

A simple program to use, The Text Collector works with a wide range of file formats but comes with predefined settings for working with WordStar, WordPerfect, or MultiMate files. The files that are necessary to run The Text Collector total just under 100K, so you shouldn't have problems

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	Address							
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Filing Status Credit card # (V, MC, AMX)	-	1	ехр	544 342				
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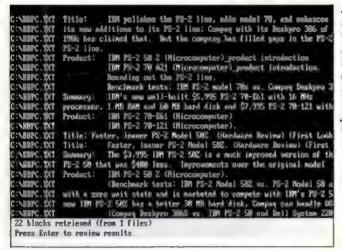
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After a successful search, The Text Collector displays single lines from blocks that contain the data specified in the selection criteria. The full path for each file is also displayed (in this case all blocks were in the same file).

running the program from a single floppy disk—assuming you can fit the files you want to search and the output files on a single disk.

To use the program at its most basic level, all you have to do is enter a search string, specify the file or files to look at, and give the program a name to use for the output file. Then you hit Enter, and the program takes off. When it finishes you can browse files, tag and save selected portions of files, or print all or parts of files.

OPTIONS ABOUND For more-complex searches, *The Text Collector* offers ten different option screens through which you can define such items as record delim-

iters, special search settings like case sensitivity and phonetic searching, and various file-saving and -sorting options. These choices can be used for the current search or session only, or can be saved in a configuration file for future use. In addition, the program lets you sort directories, control printing and video options, and customize its browse mode to include or exclude specific kinds of characters.

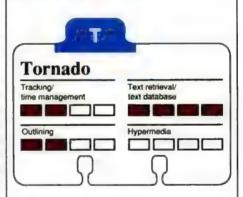
You select options before a search begins, although you can always interrupt a search, change the settings, and then start the search again. You can specify options in three ways: by pulling up an Options Menu screen and then selecting a specific menu by number, by issuing Ctrl-letter commands, or by using the PgUp/PgDn keys to scroll through the various menus.

The manual that comes with *The Text Collector* is competent but, as you would expect, not particularly exciting. That's OK because most of *The Text Collector*'s options are self-explanatory. Each option menu offers between two and nine choices. On each, the highlighted setting is explained in the lower part of the screen. As you cursor down through the choices, each in turn is explained. If that doesn't suffice, the context-sensitive help screens should do the trick.

By specifying the appropriate parameters, you can run *The Text Collector* directly from DOS. For example, typing TC MERGER C:\NOTES*.* C:\GRAB.TXT-B at the DOS prompt tells *The Text Collector* to search for all instances of the

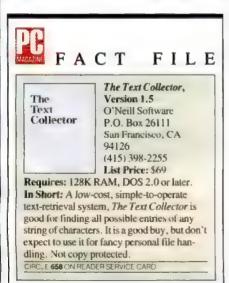
word merger in all of the files in the c:\notes subdirectory and to store the results in a file called GRAB.TXT located in the drive C: root directory.

THAT'S ALL, FOLKS If your idea of the perfect personal information manager includes an outliner, hypertext, time tracking, and project management capabilities, look elsewhere: The Text Collector's sole purpose in life is to search files and collect text. You also can't use the program to develop applications for other users. If, however, all you need is an easy way to scan files, look for references to specific information, and save or quickly print out the results of your search, then you're on the right track. The Text Collector doesn't have all the bells and whistles of the more costly and wide-ranging personal information managers, but its low price, minimal memory requirements, flexibility, and ease of use make it well worth your consideration.—Bruce Brown

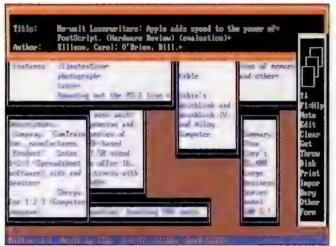


MicroLogic's *Tornado* is ironically named; unlike the twister that sent Dorothy's life spinning into disarray, this \$99.95 program introduces order. It organizes the small- to medium-sized pieces of random information that would otherwise end up scattered among various directories on your hard disk or, worse, piled in a heap of paper scraps on your desk.

Like Broderbund's MemoryMate, Tornado is a pop-up note taker. Both are easy to use, powerful, and—most important—unlikely to demand very much of your attention as they quietly coax order out of chaos. Except for a few significant functional differences, the two packages are nearly identical on a feature-for-feature basis. What really sets them apart are their



PERSONAL INFORMATION MANAGERS



Tornado's
"records" are
contained in variably
sized windows that are
displayed in a tiled or
overlapping format.
The current window
is in the contrasting
color.

user interfaces. While *MemoryMate* looks in many ways like a traditional database, displaying one record at a time, *Tornado* takes another route.

OPENINGWINDOWS Instead of using conventional full-screen records, Tornado stores information in what MicroLogic calls windows. After hitting Alt-J to enter Tornado, you can then tap N (either upperor lowercase) to open a new window, which begins as a small rectangular box on your screen. That window works just like a mini-text editor. You can type in whatever information you want, whether it's a grocery list or a paragraph of thoughts to remember for a meeting. To save the record, you tap D to invoke Tornado's disk menu and S to save your window. All of Tornado's commands work this way. You invoke a series of menus by tapping the first letter of the menu: typing P brings up the print menu, for instance. Then you invoke the command by tapping its first letter as well.

If you want to enlarge your window, you simply tap Esc from inside it; the window can then be sized with the arrow keys. A window can take up the entire screen if you like; this makes *Tornado* look like a full-screen editor. It does quite well as a simple text editor when a window is enlarged to full size.

After sizing your window, you can tap E, for edit, to continue entering text, or you can tap Esc a second time to leave the note altogether. Tapping N initiates a new note, and you are off and running again. Once you have entered a number of notes, *Tornado* displays, in either tiled or overlapping format, as many as will fit onscreen at a time. The current note is displayed in a contrasting color. Hitting E brings you into that note so you can add to it or make changes. Tapping T (for "throw out") deletes the note.

A VISUAL SEARCH By displaying up to 28 windows at a time on-screen, *Tornado* gives you instant visual access to a large chunk of your information. When you pop up the program, you immediately see many notes, though some of them may be partially or totally obscured. When you are not editing a specific note, you can browse through the notes on-screen with the arrow



keys. As you work through the "pile" of notes, as Micro Logic calls the database file, the notes nearest the top are replaced on screen by others deeper in the pile. In this way you can often find exactly what you are looking for with a simple visual search. This is not as easily accomplished in *MemoryMate*.

If you have a specific note in mind and want to get it quickly, Tornado's simple search function will find it. After making sure that you aren't inside a particular note. you hit G, for "get," and Tornado's elegant search screen replaces the note pile on-screen. The search screen has two main components: a keyword field at the bottom and a row of tiny squares that represents your pile of windows. Each square represents a window. As you type in a search string, squares begin to disappear as notes are eliminated from the search. By watching the row of squares, you can always tell how many windows match the search string that you have entered. If you are searching for windows with the word marsupial in them, you may find that Tornado has narrowed the possibilities to only a few after you type in marsu.

If so, you can tap Enter and use the arrow keys to browse through this sorted pile until you find the window you are looking for. If your text string narrows the pile down to a single window, you don't even have to bother hitting the Enter key; *Tornado* automatically pops it up. Once you are finished looking at the window or windows you have searched for, Esc returns you to *Tornado*'s main screen.

Obviously, *Tornado*'s piles of windows correspond conceptually to the database files in *MemoryMate* or any other database, and windows are really just records. You can easily create up to 50 files of records, so you have considerable flexibility in organizing your information. *Tornado* occupies 57K RAM, plus the space needed for your data.

MORE SIMILAR THAN DIFFERENT

Tornado lacks a few of MemoryMate's nicer features, including the ability to painlessly generate a tickler file and to create hypertext links. And its cut-and-paste facility works only within windows. Tornado's import and export facilities are a snap to use, however. With just a couple of key-

Almost anyone can use our spreadsheet right out of the box

That's because Silk is the only spreadsheet that gives you an on-line. context sensitive, "live" screen tutor that makes learning almost child's play.

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As you move through each step, you'll see instruction on the right hand side of your screen which guides you and literally teaches as you work.

And, since it's context sensitive, when you change a command your Silk screen tutor changes to match it. You can remove or activate the screen tutor at any time you wish.

Other spreadsheet programs are so difficult to learn that most users master only a fraction of their real potential. Instead, Silk's on-line screen tutor treats you with kid gloves. It will make you a power-user in a few sessions without ever studying the manual.



Beyond 1-2-3

Silk is simple to use but powerful. It maintains the spreadsheet features that made 1-2-3 so popular but adds what 1-2-3 and the others lack.

Silk lets you build formulas as large as 1,000 characters and append each cell with text notes, so you'll always remember what your calculations are based on.

Silk has its own unique screen editor that lets you edit large cell contents—even formulas up to half a screen long. No other spreadsheet can.

Auto Allocation

Silk even has a powerful new allocation feature that automatically distributes values proportionately over any number of cells you choose for any reason you wish to cut the pie.



With this feature you can re-allocate increased payroll or a revised financial budget at the touch of a key instead of hours of complex modeling.

You can even keep some cells at a fixed value. Many users find this feature alone is worth the purchase price.

And Silk even includes a lost work recovery feature, so you'll never lose your work again!

MAGAZINE EDITOR'S CHOICE "Silk's improved graphics, fine use of function keys, interactive help, global search and replace, and easy-to-arrange worksheet are reason enough to buy... At some point, you have to think about moving onward and upward (from 1-2-3). Silk gives you reason enough."

- PC Magazine

Best of all, you can purchase Silk now directly from Daybreak for only \$99 during this special promotion. A real value savings compared to its regular \$298.00 retail price.

Of course, not everyone can use Silk immediately. Little Rebecca, shown here, will probably have to wait at least until the third grade.

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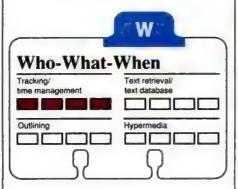
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■ PERSONAL INFORMATION MANAGERS

strokes you can pull an ASCII file into a window or export a window as ASCII text. I often use this facility for small editing jobs, such as modifying my AUTOEXEC .BAT file.

There are more similarities than differences between *Tornado* and *Memory-Mate*. Which one you choose depends largely on whether you prefer a single record interface or *Tornado*'s multiwindow approach. Either program, used aggressively, can liberate your desk from those nasty piles of Post-its, phone messages, and to-do lists.—Jonathan Matzkin



ho-What-When, from Chronos Software, is a relative newcomer, but the \$189.95 program's sensible approach to time management and project tracking is as old as the calendar—the metaphor on which the package is based. The program does much of the work involved in tying together names, phone numbers, and calendars in a meaningful way.

To anyone whose everyday tools include a pocket calendar, a to-do list, and a Rolodex, Who-What-When will look familiar. The program's start-up screen resembles a page from a "Day at a Glance" booklet and is divided into four columns: When, Who, What, and Description. The first item you are asked to enter is When. You can flag any entered time with an alarm that beeps persistently 15 minutes before a scheduled event, unless you instruct it otherwise. If you haven't assigned a specific time to an entry, Who-What-When fills in the When column with the generic words TO:DO.

GETTING ORGANIZED Who-What-When's TO:DO feature offers you a very clever way of prioritizing and delegating



Who-What-When re-creates familiar-looking office tools on-screen. It is especially helpful in handling projects, the way it is being used in the screen shown.

tasks that are not time sensitive. You can assign TO:DO chores one of four rankings. Chores ranked either A or B will be automatically rolled over to the next day's calendar if they don't get checked off. A ranking of C is for tasks that should be taken care of today because without your intervention, they will not be carried forward to the next day's list of things to do. This category is appropriate for tasks that aren't too important or that must be done within a limited time frame. Entering D, which stands for "delegate," accomplishes two things: a job is assigned to someone else's calendar (which you may view), and a reminder appears in your calendar on the follow-up date. Who-What-When's cross-referencing capability is neither hypertext nor a shared-calendaring system, but it is a step in the right direction for a single-user machine.

WHO'S ON FIRST Bookies and bachelors have long realized the importance of the well-organized black book, and the card file is the backbone of many business ventures. Who-What-When incorporates the Rolodex idea and improves on it. As you enter the names of people involved with a project, the program pops up a cardfile template, with plenty of room for notes. Going a step further, Who-What-When can print card files in Rolodex format and will dial your phone from the calendar, the phone list, or the card file.

Who-What-When asks you to assign short names of up to 8 characters to people

and up to 11 characters to projects. When you enter a new short name, the program pulls up a new blank card file, where you can enter all the pertinent information about a person or project. If you forget a short name, typing "?" pulls up a list of people or projects.

WHAT'S ON SECOND Anyone who has tried to use project management software for small-scale projects and has found it to be overkill will appreciate Who-What-When's simplified approach. The package offers reports for phone and address lists, saves information in exportable formats, and produces project time-line re-

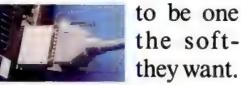


In 1988, \$3.5 billion in microcomputer software will be sold worldwide. During that same time, another



\$3.0 billion in sales will be lost to free distribution — better known as software piracy. And right now, Rainbow Technologies' Software Sentinel™ is protecting close to \$1.0 billion in software for developers who never wanted to be part of the free software distribution network in the first place. () The Software Sentinel hardware key is "execution control" software protection. It ships with the software and

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DOS, OS/2 and Xenix software in worldwide markets. To the cool tune of close to a billion dollars. So far.



ports in Gantt-chart format.

Projects are defined in the What column. They are indexed by their short name and can have subprojects. To start a project, you name it, give it a descriptive subtitle, and assign beginning and end dates. By defining a project over time and by person, Who-What-When sets up links that can be graphically displayed and printed. You can view the time bars of several projects or cross-reference a person and view the tasks by individual commitment. From the time-bar-summary level, you can "drill down" using the F9 key to the calendar event associated with a project or person and add or edit a task.

A description column allows up to 90 characters and is essentially the comment field for the Things to Do list you create on the Daily Calendar. If you need more space, Who-What-When lets you attach memos to projects or tasks and notes to card-file entries.

Who-What-When distinguishes itself in the reporting category. Typically, reports are the last thing you design for a database application and the first thing you need. Who-What-When comes with 11 readymade reports. Nor will you have any trouble seeing your reports in print: the program supports many popular printers, among them Epson dot matrix printers and the HP LaserJet Series II. In addition, the documentation comes with a notebook that contains forms to help you organize your information when you are away from your computer.

TROUBLE IN PARADISE Who-What-When does have a few shortcomings. First, Who-What-When loses points for not being able to import other file formats. In the version of the program we tested, the auto-dialer recognized only 7- or 10-digit phone numbers. If you need to dial 9 for an outside line or 1 for long distance, or to send access codes for MCI and the like, you are out of luck. A spokesman for Chronos Software said that the company is aware of this limitation and is working to correct it.

Then, too, unless you adopt a naming convention and make sure that you stick to it, you'll find that you're left with a slew of unmanageable and nonsensical short names. Even more important, if you as-



· The choice is yours

When the attributes of a product category are clearly defined, deciding which product or products deserve the accolade of Editor's Choice is relatively easy: those that possess the best mixture of features and functions, offer the best performance for the price, and represent the best design efforts of their class usually stand far from the madding crowd. In the case of personal information management software—a product category in search of a definition—the best program should have all of those characteristics, but even more important it should be the one that works for you.

Of the 25 programs we reviewed, several became personal favorites, but none could be considered everyman's personal information manager. We liked Lotus's Agenda for its categorizing, matching, and viewing capabilities as well as for its use of item parsing, an AI technique that allows the program to automatically match items to categories. However, the steep ascent of Agenda's learning curve may keep you from doing any real work for a while, undercutting the program's effectiveness as a personal productivity tool.

Symantec's GrandView is the outliner to beat all outliners, offering the kind of intelligent printer support you'd like every program to have. Trouble is, the program's "outline-centric" approach probably won't suit users with different cognitive styles.

askSam Systems' askSam is the text database of choice, with impressive reporting capabilities, hypertext, and a powerful search language. Although askSam places no restraints on the way you enter data, to get the most out of the program you need to bring to it some experience in conducting searches and a working knowledge of Boolean operators—not exactly everyone's idea of fun.

Polaris Software's PackRat and Persoft's IZE come closest to doing it all. PackRat, which includes a runtime version of Microsoft Windows, houses seven useful facilities under one roof. But PackRat's linking capabilities aren't as complex as they could be; as it stands, any item in any one of PackRat's facilities can be attached to phone book entries, but only tasks can be attached to other tasks.

IZE is more robust, offering the ability to link dynamically to files created in other applications, retrieve documents using keywords or search strings, and automatically place search results into hierarchical outline form based on the number of files that share keywords. But if your information management needs are more modest-say, limited to searching your hard disk for all the files that contain a certain word or phrase-simpler and cheaper programs like Micro Logic's Tornado and Microlytics' GOfer are also great, and will suffice.

sign a short name inconsistently, you won't be able to trace any cross-references to that short name across people and projects. If you decide to change a short name, you'll have to manually search for and change all other occurrences of that short

name: unfortunately, the program isn't smart enough to make those substitutions for you.

Who-What-When doesn't break new ground, but it does tie together some tried and true desktop accessories that have al-



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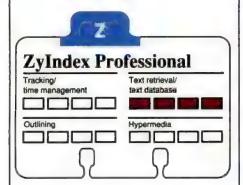
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PERSONAL INFORMATION MANAGERS

ways helped people do their work. It may not offer hypertext or outlines, but it certainly can help you manage resources, tasks, and projects.

-Priscilla Tate-Austin



Personal information can differ not only in content from user to user; but also in form and purpose. For example, while some people need to track tasks, appointments, or random data, others must maintain comprehensive indexes of multiple files. If your needs fall in that latter category, you must see *Zylndex Professional*, a \$295 program whose raison d'être is the creation and maintenance of search indexes for multiple files. These files can either come from most major word processors or database programs or can consist of information downloaded from on-line systems.

Besides ZyIndex Professional, there are two other versions of the program. Zylndex Personal costs \$95 and is best suited for indexing up to 500 files on a dual-floppy-disk system. ZyIndex Plus costs \$695 and is targeted at users who deal with lots of huge files, such as large data dumps. Both the Professional and Plus versions can use a \$95 add-on called ZyFeatures, which contains a thesaurus and programs that can select parts of files and save search criteria. The price of Zylndex Plus includes a license to use the program on a network with up to five workstations. All versions will work on a dual-floppy-disk system, but a hard disk is recommended for the Plus and Professional editions. You must have at least 448K RAM available to run ZyIndex Professional.

To give you a sense of what you can expect, the *ZyIndex* tutorial, which comes on a separate diskette, walks you through the program's most basic functions. Noninti-



Once ZyIndex locates matches of specific criteria, you can browse freely through the files selected. Your specified search criteria are highlighted.

midating and straightforward, it should dispel any anxiety you might have about the program's difficulty as it introduces you to Zylndex's somewhat single-purpose approach.

HOW IT WORKS Zylndex works by creating an index list of every word and number in specified files, keeping track of what file or files each word is in and where it is within each file. Common words like articles and conjunctions, called noise words, are ignored. The maximum single file size is 64K, but that doesn't count noise words. As a practical matter, therefore, Zylndex should easily handle files up to 100K.

You can build your own noise-word list; the default includes 145 words, to which you can add 110 for a maximum of 255 words. There is also a maximum of 500,000 unique words per index list, which shouldn't be much of a limitation.

The program allows three kinds of indexing: menu, auto, and direct. With menu indexing, a maximum of 64 files can be indexed because that's all that can be displayed on the screen at once. With autoindexing, you create a command file run from DOS that specifies what files to include and what filenames and file types to exclude, and the file then runs the indexing process. "File-only" indexing tracks what files the words are in but not where they are located.

Direct indexing lets you control the indexing process right from DOS. For example, the command ZYI C:\THES-NOTS*.* LOLLAPALOOZA tells ZyIndex to index all of the files in the sub-directory THESNOTS on a disk named LOLLAPALOOZA. If you kept thesis notes and on-line data search dumps in the same subdirectory, the above command would automatically index the files.

Zylndex doesn't reindex files that have not changed since the last indexing; this is a big time-saver. While it indexes files, Zylndex tells you the number of different



gle or multiple files to enable quick search-

ing. ZyLAB also offers a more expensive

PIM called ZyIndex Plus (\$695). Not copy

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How I Lost A Report For Six Hours And Found It In 30 Seconds.

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A phrase, a fact, a note, a date. GOfer finds it when I need it.

I can even use GOfer to browse through files to find related information. Then I can print it, create a new file, or cut and paste it into the document currently in

Even among countless PC files, GOfer software finds that certain piece of information using a one or two word clue, even if I can't remember the spelling.

And GOfer works with my files exactly as they are. There's no need to spend hours indexing or converting files before GOfer starts

searching. You don't have to be a computer wiz to get GOfer up and running within 15 minutes.

So if I need a certain document written to Jill Smith that mentions "insurance" and "third quarter profits," I just summon GOfer with one keystroke and give him the word. Within seconds, that document is at my fingertips.

"After one hour, I worried.

After three hours, I sweated.

After six hours, I found GOfer."

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PIMs

words in each file and the percentage of the job it has completed.

THE SEARCH IS ON Zylndex's second program function, searching, uses index lists to find whatever you specify. A search request can consist of up to 160 characters. A "search within" feature lets you specify the number of words apart two items can be. For example, the expression "friends w/5 court" looks for files where the word

Indexing is ZyIndex's game; it does the job in a no-fuss, no-muss manner, and it's fast and easy to use.

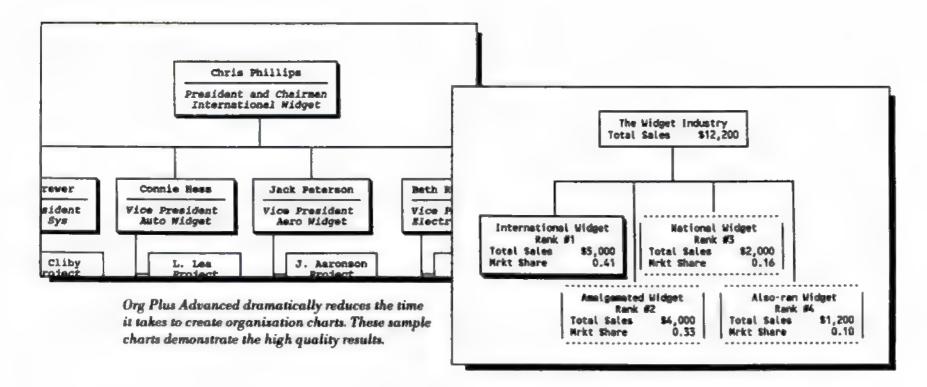
friends is within five words of the word court.

You can also use Boolean operators to conduct more-sophisticated searches, such as those in which the files selected depend on relationships between sets and subsets. But to do so it helps if you have a solid grounding in set theory.

After you enter a search request and the search is completed, *ZyIndex* displays the number of files containing the requested information. You can then select files by name and browse through them. If you want, you can mark and save or print selected portions of text.

SENSE AND SENSIBILITY Zylndex's approach to finding information is more low-key and less dynamic than that of its closest competitor, AskSam, which takes you to the first occurrence of a search request. But therein lies the main difference between the two programs: AskSam has more of the attributes of a database management system; Zylndex is above all an indexing and searching tool.

Indexing is Zylndex's game; it does the job in a no-fuss, no-muss manner, and it's fast and easy to use. If all you really need out of a personal information manager is the ability to do free-form text searching through indexes, it's hard to beat Zylndex.—Bruce Brown



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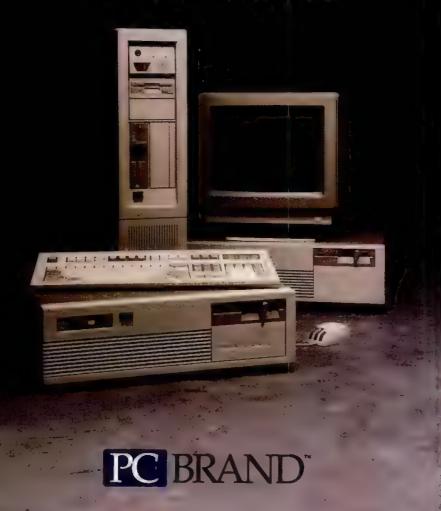
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Standard System Features:

- 80286 Processor Operating at 20MHz with Zero Wait States in interleave mode delivering 26MHz Effective Throughput
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- 1.2MB 5.25" or 1.44MB 3.5" Diskette Drive
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- Enhanced 101-key AT Style Keyboard
- High Capacity 200 Watt System Power Supply
- Real Time Clock/Calendar with 5 Year Battery
- 80287 Co-Processor Support
- Industry Standard BIOS with full MS/DOS, OS/2, XENIX, NOVELL, 3COM, and PCNET compatibility
- Built-in System Board LIM 4.0 EMS hardware drivers
- User configurable I/O timing permitting compatible operation with older peripherals or faster I/O for newer devices
- 8 Slot motherboard design (6 16Bit & 2 8Bit)
- · Medium foot print case with 5 Disk Drive bays

Options:

- Tower Case 4MB Interleaving Ram Card
- Custom configurations w/Name Brand peripherals of your choice
- Compaq® Style LCD Portable Factory Installed RAM Upgrades

Standard Pre-Built Configurations:

286/20 With 512K, Hard Disk Drive, Monitor & Video Card							
Drives .	40MB-40MS	40MB-28MS	80MB-28MS	110MB-28MS 1:1 RLL	150-16MS 1:1 ESDI	320-16MS 1:1 ESDI	
Mono	\$1890	\$1999	\$2130	\$2396	\$3623	\$4023	
EGA	52284	\$2393	\$2524	\$2790	\$4017	\$4417	
VGA	\$2455	\$2564	\$2695	\$2961	\$4188	\$4588	

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Video Drive	1 Floppy	2 Floppy	20MB	30MB	40MB
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RGB	\$879	\$954	\$1148	\$1174	\$1291
EGA	\$1089	\$1164	\$1358	\$1384	\$1501

PCBRAND 386/20 \$2100



20 MHz Clock, Zero Wait Operation Norton SI 24 • Landmark Speed 30MHz 1024K, 1.2MB or 1.44MB Drive, 101-Keyboard

Standard System Features:

- Intel 80386 Processor Operating at 20MHz with Zero Wait States in interleave mode delivering 30MHz Effective Throughput
- 1024K RAM standard expandable to 16MB via 32Bit RAM boards using 256K and/or 1MB 100ns RAM chips
- 1.2MB 5.25" or 1.44MB 3.5" Diskette Drive
- High Performance Dual Hard Drive/Floppy Drive controller
- · Enhanced 101-key AT Style Keyboard
- High Capacity 200 Watt System Power Supply
- Real Time Clock/Calendar with 5 Year Battery
- 80287 or 80387 Co-Processor Support
- Industry Standard BIOS with full MS/DOS, OS/2, XENIX, NOVELL, 3COM and PCNET compatibility
- User configurable I/O timing permitting compatible operation with older peripherals or faster I/O for newer devices
- 8 Slot motherboard design (6 16Bit & 2 8Bit & 2 32Bit)
- · Medium foot print case with 5 Disk Drive bays

Options:

- Custom configurations w/Name Brand peripherals of your choice
- Compaq® Style LCD Portable 8MB 32Bit RAM Card Upgrade

Standard Pre-Built Configuration:

386/20 With 1024K, Hard Disk Drive, Monitor & Video Card							
Drives Video	40MB-40MS	40MB-28MS	80MB-28MS	110-28MS 1:1RLL	150-16MS 1:1ESDI	320-16MS 1:1ESDI	
Mono	\$2590	\$2699	\$2830	\$3096	\$4323	\$4723	
EGA	\$2984	\$3093	\$3224	\$3490	\$4717	\$5117	
VGA	\$3155	53264	\$3395	\$3661	\$4888	\$5288	

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- High Performance Dual Hard Drive/Floppy Drive controller
- Enhanced 101-key AT Style Keyboard
- High Capacity 200 Watt System Power Supply
- Real Time Clock/Calendar with 5 Year Battery
- 80287 or 80387 Co-Processor Support
- Industry Standard BIOS with full MS/DOS, OS/2, XENIX, NOVELL, 3COM and PCNET compatibility
- User configurable I/O timing permitting compatible operation with older peripherals or faster I/O for newer devices
- 8 Slot motherboard design (6 16Bit & 2 8Bit & 2 32Bit)
- Medium foot print case with 5 Disk Drive bays

Options:

- Tower Case Factory Installed RAM Upgrades
- Custom configurations w/Name Brand peripherals of your choice
- Compaq® Style LCD Portable 8MB 32Bit RAM Card

Standard Pre-Built Configurations:

386/25 With Hard Disk Drive, Monitor & Video Card							
Drives Video	40MB-40MS	40MB-28MS	80MB-28MS	110MB-28MS 1:1RLL	150-16MS 1:1ESDE	320-16NE 1:1ESDI	
Mono	\$2940	\$3049	\$3180	\$3446	\$4673	\$5073	
EGA	\$3334	\$3443	\$3574	\$3840	\$5067	\$5467	
VGA	\$3505	\$3614	\$3745	\$4011	\$5238	\$5638	

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^{*286} Systems come w/512K RAM, 386 Systems w/1024K.

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LAN GATEWAYS PART 2

Personal and mainframe computers are not competitors. On the contrary, they are increasingly becoming partners: because the technological breakthroughs that bring advances like the 80386 chip to the PC have not been invented in a vacuum, the computing capabilities of mainframes are also continually being enhanced. The demand for links between these computing resources is growing, and technology is responding with an increasing variety of solutions to the problem. One of them is a LAN gateway.

In the last issue of PC Magazine, we introduced LAN gateways-products that furnish LAN-linked PCs with a shared portal into the mainframe. In that article, "Building WorkGeneric add-in

LAN gateways can

reside in nearly any

PC on nearly any

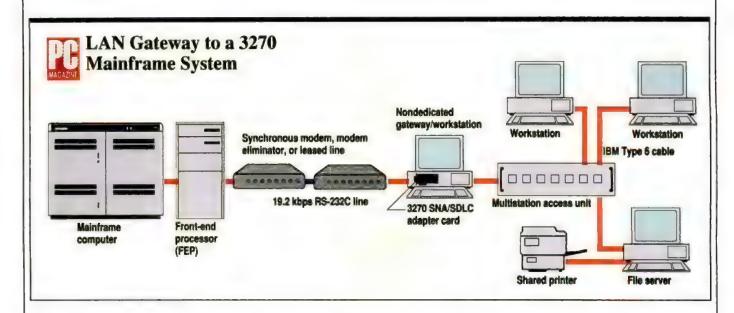
PC-based LAN,

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system you have.



STANDALONE LAN GATEWAYS



group Solutions: LAN Gateways, Part 1' (henceforth referred to as Part 1), we covered two products that include LAN gateways as part of a total LAN package including a network, file server, and print server: the Harris 9300 system, and Banyan's VINES running on the 80386-based Banyan Corporate Network Server.

Instead of presenting an "all-in-one-box" solution, the products treated in this issue can run on existing LANs. This can be a more flexible and economical approach, especially if you've already invested in a LAN. In these standalone products, a specially equipped computer, such as an IBM PC AT, is assigned the role of a LAN gateway to the mainframe. Sometimes this computer is totally consumed by, and therefore dedicated to, this task. In many other cases, the gateway machine can act simultaneously as a gateway and as a workstation on the LAN.

The LAN gateways evaluated in this issue consist of three basic things: a special card that fits into the gateway station's interface bus; software that runs in the gateway station, linking the card to the LAN; and terminal emulation software that runs on each PC on the LAN. The emulation software and gateway software "talk" through the communications services software of the network.

NETBIOS Most of the PC-based LANs operating today use the Network Basic In-

put Output System (NetBIOS) to supply network transport services. Increasingly recognized as the standard for PC LAN communication, NetBIOS recognizes and carries blocks of data to and from each station on the network and is capable of communicating over all kinds of network cabling, be it coaxial, twisted pair, or fiber optic.

Because these LANs use NetBIOS, you can integrate the products reviewed in this issue into a wide variety of networks. and you can even set up and use a LAN gateway on a network that doesn't have a file server. These LAN gateway products will run with equal efficiency on a variety of LAN operating systems, including IBM's PC Local Area Network Program (PC LAN for short), Banyan's VINES, 3Com's 3+Share, and Novell's NetWare. (However, if you need to choose a gateway to run under Novell's Advanced NetWare, Version 2.1, you should check to see if the gateway supports Novell's IPX network transport software in addition to NetBIOS.)

CATEGORIES AND CAPABILITIES

To keep the project manageable, we limited our reviews to products emulating an IBM 3274 Communications Controller attached to the mainframe front-end processor through a 19.2-kilobit-per-second RS-232C link conforming to IBM's Systems Network Architecture (SNA) protocol

scheme. (See the topology diagram in this issue, as well as the tutorial and glossary that are in Part 1 for more information about IBM's 3270 products and how they work together.)

The test-bed for our evaluations consisted of a network of IBM PC-XTs connected by IBM Token-Ring Network adapter cards and running IBM's PC LAN Support Program to furnish NetBIOS services. Typically, this kind of network would also include networking software like IBM's PC LAN, but although we had a PC LAN file server on the network, we didn't use its services. We used an IBM PC AT as the gateway station on the network.

WHAT WE LEARNED We experienced problems setting up our test networks, many of them—despite excellent assistance from the cooperative systems programmers caring for them—coming from the mainframe end. We learned that there are all manner of arcane variables that must be correctly set in the mainframe's communications, operating, and security systems before the gateway can communicate. For this reason, when setting up a gateway, detailed coordination with the mainframe's system programmers is essential.

For example, entities called *pacing val*ues must be properly set for gateway communications. Unfortunately, pacing commands can exist in three places in the 3270 communications architecture, and some entries override others. However, if the pacing isn't set correctly, the system won't work.

GLUTTONS FOR RAM We also learned that gateways eat RAM. All of the sales talk about hotkeying between 3270 sessions and DOS applications sounds great until you try to squeeze the DOS applications into the PC while it's emulating a terminal. Most gateway terminal emulation software packages gobble up about 130K of RAM in each workstation, and certain configurations of some products bite over 300K, DOS, NetBIOS, and the LAN redirection software for the workstation easily use another 130K. Additionally, the software that enables the machine to function as a gateway requires over 300K, while NetBIOS and DOS can take up another 50 to 100K.

While almost all of the gateway packages allow the machine functioning as a gateway to simultaneously perform other tasks, we don't think that is a good idea. If the DOS task freezes the gateway machine or if the person operating the machine unthinkingly hits Ctrl-Alt-Del, all of the mainframe traffic is lost, and you might drop the communications line to the frontend processor.

We also observed that it is the software that is the key to gateway performance. Some cards loaded with on-board processors were beaten by simpler devices by virtue of the latter's software. We also came to value some of the big, RAM-eating programs. We learned that the reason some of these programs are so big is to provide users with features like menus that make them easier to use. The big programs also often contain error traps, making them more tolerant of communications errors.

GATEWAYS ARE GOOD You aren't gambling your company's or client's productivity by using a LAN gateway instead of individual terminals or PCs attached to a terminal cluster controller through a coaxial adapter. There are currently highly competitive, reliable products on the market that can add value to mainframe installations, LANs, and individual PCs by tying them together.

ATTACHMATE CORP.

Attachmate Extra!

Part of a versatile line of products from Attachmate Corp., a company that's been in the micro-to-mainframe business since 1982, the Extra! 3270 gateway is packed with features. Although not among the lowest-priced products in the industry (a gateway capable of supporting ten simultaneously operating terminals costs \$4,570, and from there the added cost-per-station climbs sharply in comparison with the competition) Attachmate's Extra! products performed well on the benchmark tests and feature especially good terminal emulation software.

MIX AND MATCH The interesting news about Extra! is that you can mix and match the line of 3270 products to meet your needs, blending in gateway products from IBM and other vendors to customize your installation. For example, the Extra! software will run on the SDLC interface cards sold by IBM and, conversely, IBM software can run on the Attachmate SDLC card. Attachmate also markets an SDLC card for IBM's Micro Channel architecture expansion bus.

Attachmate's 3270 terminal emulation software has a heavy load of features, but



Attachmate Extra!
Attachmate Corp.

3241 118th SE Bellevue, WA 98005

(206) 644-4010
List Price: Extral connectivity software for each workstation, \$425: Extral 3270 Gateway option software, \$50; SDLC adapter

way option software, 350, 350.c. adapter card, \$270; Interactive 3279 S3G Host Graphics option, \$595; Interactive 3179G All Points Addressable graphics option, \$695.

Requires: Gateway station: IBM PC, XT, AT, PS/2, or compatibles; 512K RAM. Network stations: IBM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS services. In Short: A flexible line of products featuring excellent documentation and terminal emulation software that can be mixed and matched with other vendors' products.

CIRCLE 683 ON PEADER SERVICE CARD.

despite that, each terminal loses only about a minimum of 140K. The software supports a wide range of terminals—including the relatively rare IBM 3278 Model 5 terminal that displays 27 lines by 132 columns of text—and automatically senses what type of video adapter is in the PC to reduce the amount of customizing that you have to do during installation. The HLLAPI (IBM's High-Level Language Application Program Interface) SRPI, and 3270-PC application program interfaces (APIS) come standard, and mainframediven print jobs can access printers attached to PCs in the background mode.

It's difficult to say how practical it is, but one of the most impressive features of the terminal emulation software is its ability to concurrently display up to four active sessions of terminal emulation, printer emulation, and DOS activity in different screen windows. While four windows might be more than most people can use, there are obviously lots of uses for two-window split-screen 3270/DOS operation. The window display software gives you the ability to capture screen images and copy text between windows.

EMULATION EXTRAS Besides coming with many features standard, the Extra! terminal emulation software offers a number of options. Any machine with a CGA adapter can display IBM S3G program symbols by adding the Extra! 3279 S3G Host Graphics option. PCs with EGA adapters can gain IBM 3179G graphics terminal capabilities that allow them to capture images produced by vector graphics image-processing programs on the mainframe. If you want to upgrade your IBM PS/2 computers with the 8514/A graphics adapter and 8514 high-resolution monitor, the Extra! hyperGraph/8514 option will give you the spectacular screens of mainframe graphics programs designed for the IBM 3179G All Points Addressable graphics display.

Attachmate's 3270 gateway communications software, which takes up only about 270K, includes strong administrative features. The security control available through the gateway is excellent. Nicely designed displays make it quite easy to change session pools and user access. You can also quickly check the status

of SNA link communications and Trace operations.

The Extra! gateway uses LU pooling so that each network station can contend for unused sessions instead of having them assigned to specific users. However, if sessions need to be permanently assigned to users with specific capabilities, the software allows them to be.

Although it's hard to beat the quality of the documentation produced by 3Com Corp.'s CSI Division, Attachmate's manuals are excellent; both are clearly indexed and well written. The screen diagrams, which show you what to expect, are particularly good. Attachmate Corp. also maintains a free bulletin board for technical support and has a regular program of seminars for API programmers and system integrators in many parts of the country.

DIGITAL COMMUNICATIONS ASSOCIATES INC.

DCA IRMALAN SDLC Gateway

From the company that made the name *Irma* synonymous with micro-to-main-frame connections, DCA's IRMALAN SDLC Gateway kit is what you'd expect: an industry-leading package loaded with features. Although the gateway's software takes up a lot of RAM, DCA charges only \$1,995 for a package that connects five networked PCs to a mainframe and does a great job of printer emulation.

DEDICATED OR FIRST-COME Like all DCA products, IRMALAN is well supported and includes good documentation. Providing up to 32 concurrent host sessions that can be dedicated to individual users or pooled for first-come first-served sharing, the IRMALAN SDLC Gateway features a gateway card that is a full-size PC expansion board equipped with an 80186 processor. I particularly liked the LEDs on the card that flash when communications takes place. If you have to troubleshoot the system, these little indicators at least let you know if the software is communicating with the board.

The gateway communications software includes a Trace utility that shows activity on the communications line. The manage-



(800) IRMA-526

FACT FILE

DCA IRMALAN SDLC Gateway

Digital Communications Associates Inc. 1000 Alderman Dr. Alpharetta, GA 30201-4199

List Price: IRMALAN SDLC gateway adapter and gateway software, \$1,195; gateway package with IRMALAN SNA software for 5 workstations, \$1,995; IRMALAN SNA Workstation software for an additional 5 workstation DFT Start Kit, \$1,495; SNA Workstation Convenience Kit for an additional 5 workstations, \$1,395; IBM 3179G All Points Addressable graphics option, \$595 per workstation.

Requires: Gateway station: IBM PC, XT, AT, PS/2, or compatibles; 512K RAM. Network stations: IBM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS services. In Short: DCA's IRMALAN SDLC Gateway is an industry-leading package loaded with features. The software does an excellent job of printer emulation and provides many management controls.

CIRCLE 652 ON READER SERVICE CARD

ment utilities also show LAN details derived from NetBIOS-like error counts and the status of adapters on the network. These management tools can run from any network workstation, but the machine acting as a gateway loses over 308K of RAM to the software.

The IRMALAN SNA Workstation software enables PCs to emulate an IBM 3278 terminal (Models 2, 3, 4, or 5) and can handle five concurrent host sessions and a DOS application. Although it requires each workstation using it to give up a minimum of 177K, it unloads from memory easily if no other TSR programs are loaded on top of it. The terminal emulation supports the LIM 3.2 or later EMS standard and includes programming support for HLLAPI.

OPTIONAL GRAPHICS PCs equipped with a CGA can emulate the IBM 3279 terminal (Models 2A, 2B, 3A, or 3B). The optional graphics terminal emulation software gives a PC with a color graphics card the ability to emulate IBM's 3179G All Points Addressable graphics display. Host-based file-transfer programs are also

available as extra-cost options.

DCA does one of the best jobs of printer emulation among gateway companies, supplying translation tables that make any of 14 popular types of printers look like an IBM 3287 to the mainframe. Other vendors typically support a smaller range of printers, generally starting with the Epson MX-80 series.

If you want to connect more than the five PCs linkable with DCA's basic package to your gateway, all you have to do is purchase additional terminal emulation software packages; for \$1,395 you can connect five more. Besides gateways for mainframe connections, DCA also offers a more limited type of gateway that connects to the terminal cluster controller. Digital Communications is also one of the first companies to bring a new kind of gateway to the market. Called the 802.2 gateway, it is a software-only product that links workstations on an IBM Token-Ring Network to token-ring-connected terminal cluster controllers and front-end processors.

EICON TECHNOLOGY CORP. Eicon Access/SDLC

Headquartered in Montreal and popular in Europe, Eicon Technology Corp. isn't well known in the U.S. Thanks to its unique approach to add-on communications products featuring a low-cost, low-RAM-requiring SDLC gateway, this low profile may not last for long.

The Eicon Access/SDLC 3270 Support LAN Gateway is based on a communications card that carries a Motorola 68008 processor. By downloading different programs to the processor, the card can become any one of several different communications devices: Eicon markets a version of the card for the Micro Channel architecture interface used in IBM PS/2s; Novell remarkets the Eicon cards as part of its X.25 gateway system.

ONLY 8K OF RAM Because it contains its own RAM and is so autonomous, the Eicon Access/SDLC 3270 Support LAN Gateway takes only 8K of RAM in the host computer plus 1K for each session. This means that the \$2,195 Access 3270 LAN Level-I that can distribute up to 32 sessions

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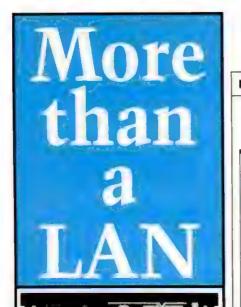
job until its current work is finished, automatically printing each new job in turn.

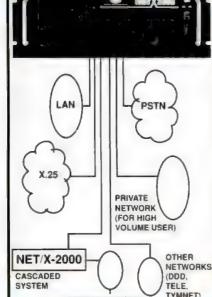
No wonder *PC MAGAZINE* has *twice* named The Logical Connection its Editor's Choice. In fact, they called it, "... more than logical — maybe inspired."



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STANDALONE LAN GATEWAYS



FACT FILE

Elcon Access/SDLC Eicon Technology Corp. 2196 32nd Ave. (Lachine) Montreal, Ouebec

Montreal, Quebec Canada H8T 3H7 (514) 631-2592

List Price: Eicon Access/SDLC 3270 Support LAN Gateway for 8 users/32 sessions, \$2,195; 256 users/254 sessions, \$3,195.

Requires: Gateway station: IBM PC, XT, AT, PS/2, or compatibles; 512K RAM. Network stations: IBM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS services. In Short: The Eicon Access/SDLC 3270 Support LAN Gateway is one of a family of PC-to-mini/mainframe SDLC communications products. The software does a good job with basic terminal emulation functions. Its specific strength is Eicon APPC—Eicon's add-on APPC application program interface.

across a network among up to eight PCs takes only 40K of RAM in the gateway host machine. A \$3,195 version of the product can distribute up to 254 sessions and occupies only about 262K of gateway

On the other hand, the terminal emulation software takes nearly 300K of RAM on each workstation. The software does a good job of supplying basic functions. It can establish up to nine concurrent terminal and printer emulation sessions from a single PC, and the built-in file transfer program can move files between the PC and the mainframe's IND\$FILE utility in the background mode. Eicon's package gives a PC the power to emulate two types of IBM terminals: a 3278 (Model 2) or a 3279 color display. The company also sells a separate graphics option that lets a PC equipped with a color/graphics adapter emulate a 3279 S3G graphics terminal.

The Access/SDLC package has a builtin scripting capability. There are only ten commands in the script language and there is no error checking or branching, but you can create simple scripts that will sign a PC onto a mainframe session and perform certain tasks automatically. These tasks are managed through a calling directory. In theory, you simply pick the session/function you want from the directory and start to run it. Then you cross your fingers, because if there are any communications errors this script file won't recognize them.

FAST SETUP The installation software for this product is menu driven, and the setup is fast. The gateway software includes a Trace utility that we used to find a communications problem during installation and a Log utility that tracks conversations between the host and specified sessions. Network management commands in the gateway software give control over the allocation of sessions and the communications line.

Eicon makes its mark in this industry in its early and strong support for IBM's APPC/LU6.2 program-to-program communications protocol. The EiconAPPC is a separate product that takes about 35K of RAM in the terminals. It is a private implementation of IBM's architecture that is smaller and more flexible than IBM's product. This strong APPC capability and the ready interfaces to various forms of Eicon SDLC and X.25 communications adapters make the Eicon products popular with developers and system integrators.

GATEWAY COMMUNICATIONS INC.

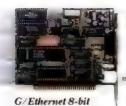
Gateway Communications G/SNA Gateway

Despite what its name may imply, Gateway Communications sells more than gateways; the company also markets its own local area network interface cards, as well as a customized version of Novell's *NetWare*, and has earned a good reputation in both markets. Graced with good operational and management features, as well as tried-and-true terminal emulation software, Gateway's LAN gateway packages start at \$2,580 for a system that can distribute a total of eight LUs across a network.

The G/SNA Gateway's intelligent SDLC interface card is equipped with an 80186 processor and takes about 75K of RAM from its supporting PC. The gateway communications software includes a

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PCM25



FACT FILE

Gateway Communications G/SNA Gateway

Gateway Communications Inc. 2941 Alton Ave. Irvine, CA 92714 (800) 367-6555 (outside Calif.) (714) 553-1555

List Price: G/SNA Gateway for 8 sessions, \$2,580; for 16 sessions, \$3,580; for 32 sessions, \$4,580.

Requires: Gateway station: IBM PC, XT, AT, PS/2, or compatibles; 512K RAM. Network stations: IBM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS or IPX (NetWare) services.

In Short: The G/SNA Gateway is one of a line of gateway and LAN products offered by this company. It contains good operational and management features, and the company has a good record of support.

CIRCLE 649 ON READER SERVICE CARD

utility program with trace and status-monitoring capabilities.

SAME EMULATION The terminal emulation software that comes with the G/SNA Gateway is the same as that sold with the company's Bisync and X.25 connections. Each station using it can run up to four sessions of terminal or printer emulation, and it allows 3270 and Remote Job Entry (RJE) sessions to be combined on the same communications line. This can be an economical feature for companies that use both of these services. However, each workstation loses about 150K to terminal emulation; they lose less if file transfer is not used.

Along with the terminal emulator, Gateway packages a useful script language that includes the ability to look for specific screen prompts. What's more, it includes conditional branching, hence the script becomes more of a program than a set of plodding instructions. With these tools you don't have to be a programmer versed in a specific arcane API to automate log-on and program activity sequences. Speaking of APIs, Gateway offers one that is relatively simple, but effective. It is even well explained in the documentation, which is excellent: the manual is full of good information.

CABLE INCLUDED Gateway always does an excellent job documenting installation and setup requirements. To make installing the G/SNA Gateway easy, the company even includes the right kind of RS-232C cable. (Since there is a significant difference between the RS-232C cables commonly used for asynchronous modem communications and the cables used for synchronous data lines, getting exactly the right cable is important.) Gateway supports its products with regular training seminars in a dozen U.S. and Canadian cities; the company also offers free unlimited telephone support and free access to a bulletin board service.

IBM CORP.

IBM PC 3270 Gateway

You would expect IBM to turn out a good board for SNA communications. It did: IBM's gateway was the only one that finished our testing cycle ahead of schedule, letting us get to bed before sunrise for once. A quintessentially IBM product, the gateway is functional but not frilly. And it has lots of options.

ONE ON ONE IBM's gateway distributes 32 sessions across the network, but each network station can use only one printer (3287) and one terminal (3278 or 3279) session. While systems from other vendors typically allow multiple gateway connections, each IBM network station can communicate with only one gateway at a time.

The \$240 IBM SDLC Adapter (P/N 1501205) works on all computers with a PC-type bus. It supports line speeds of up to 19.2 kilobits per second. If you want to use a PS/2 with Micro Channel architecture as a gateway, IBM has an SDLC adapter for those systems, too (P/N 6450348). If you need service at speeds above 19.2 kilobits per second, IBM suggests other architectures, like a direct Token-Ring Network connection to a FEP.

The \$475 IBM PC 3270 Emulation Program contains the software for terminal emulation, as well as gateway operation and management. You need a copy for every network station. The terminal emulation program includes application program



FACT FILE

IBM PC 3270 Gateway

IBM Corp.

Contact your local IBM dealer. (800) IBM-2468 (dealer location

information)

List Price: IBM PC 3270 Emulation Program, \$475; Workstation Program, \$495; PC 3270 Emulation Program, Entry Level 1.2, \$325; SDLC Adapter (PC Bus), \$240; Multi Protocol Adapter/A (MCA), \$295.

Requires: Gateway station: IBM PC, XT, AT, PS/2, or compatibles; 256K RAM. Network stations: IBM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS services. In Short: IBM has a fine gateway product. The package lacks frills, such as allowing three to four sessions on a workstation, but it is simple, fast, and flexible.

CIRCLE 646 ON READER SERVICE CARD

interfaces for the 3270 PC API and IBM's Server Requester Program. IBM includes a Trace utility in the gateway software but has few other management options aside from session configuration.

MAKE ROOM FOR DOS The gateway software loaded on our machine took nearly 300K of RAM, while the terminal emulation software took a little over 180K. IBM stresses the compatibility of this software with its *TopView* windowing program because *TopView* lets you cut and paste and perform other operations between windows, as well as run programs in different windows. But if you have *TopView*, terminal emulation, NetBIOS, and the redirector from IBM *PC LAN* loaded in the same machine, you won't have a great deal of room for DOS applications.

The documentation for the IBM PC 3270, Version 3.04, is good. A section called "Who You Should Know," which clearly describes the people inside and outside the mainframe computer room you need to talk to before installing a LAN gateway, is particularly enjoyable. The manual also includes worksheets to help you plan the software configuration.

Finally, IBM's gateway is fast: it posted the best throughput figures in several categories of the performance tests. While it is not packed with features, it is easy to set up and use.

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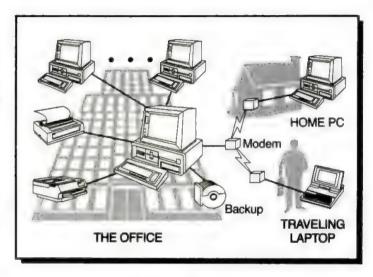
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Server Technology, Inc. 140 Kifer Court Sunnyvale, CA 94086

ICOT CORP. ICOT netPATH/A SNA-3270 ICOT netPATH/B SNA-3270

We tested two LAN gateways marketed by ICOT—the netPATH/A SNA-3270 and the netPATH/B SNA-3270. Each of these products evolved from the products originated by a different veteran micro-to-mainframe communications vendor, and despite incredibly similar names, they are vastly different products.

The main feature of the netPATH/A SNA-3270 Gateway, which was originally marketed by Pathway Design, is its ability to distribute up to 128 LUs to workstations throughout the network. The ability to handle so many LUs is significant: at a maximum of five LUs per workstation, a lot of people can have simultaneous ses-

sions through this gateway.

The netPATH/A's adapter is a half-size board containing an 80188 processor and 256K of on-board memory, with a daughterboard attached. We were able to easily insert the gateway board into a crowded AT in a slot already partially occupied by an Intel Above Board memory card. A nice feature of this board is the ability it gives you to change the I/O and interrupt settings without actually removing the card from the AT. This comes in handy if you have to resolve conflicts between other I/O cards in a crowded AT.

The software for this gateway, the ICOT Network Supervisor, runs on any PC in the network gateway and takes over 300K of RAM. It contains many network management functions, featuring a menu that lets you select between viewing network status messages, displaying statistics, and controlling the connections between various nodes and LUs. The statistics message is particularly useful as a management tool to ensure that resources are properly used.

The gateway software also offers some helpful utilities for you to keep track of your system operation. The Diagnostic Trace facility reports on events on both the SNA communications line and on the Net-BIOS link between workstations and the gateway. It's a nice tool for troubleshoot-

ing both sides of the communications system. A Network Logging utility records communications events such as initiation and termination of sessions, aborts, and transmission errors.

The netPATH/A's terminal emulation package can use networked printers and locally attached printers for mainframe-driven print jobs. It takes a minimum of 170K on each workstation.

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■ STANDALONE LAN GATEWAYS

SIMILAR NAME, NOT MARKET Despite the similarity of the netPATH/B SNA-3270's name to that of its sister, it is a different product that is aimed at a separate market. The netPATH/B has been designed for high performance and to support high-quality graphics on appropriately equipped PCs.

Originally marketed by Integrated Network Systems Inc., which is now a part of ICOT Corp., the netPATH/B SNA-3270 gateway performed well in most of our performance tests, but it could not complete the test requiring it to use high-speed screen buffer dumps to exchange data between the terminal and the host. Although we were unable to test a repaired version, ICOT reports that it has found the bug and fixed it.



FACT FILE

ICOT Corp. P.O. Box 8179 Natick, MA 01760 (800) 343-0515 (617) 237-7722

ICOT netPATH/A SNA-3270

List Price: For 8 LUs, \$2,595; for 16 LUs, \$3,595; for 32 LUs, \$4,595; for 64 LUs, \$5,595; for 128 LUs, \$6,595.

Requires: Gateway station: IBM PC, XT, AT, or compatibles; 256K RAM. Network stations: IBM PC, XT, AT, or PS/2; 256K RAM. LAN with NetBIOS service.
In Short: The netPATH/A SNA-3270 package includes a short SDLC interface card,

gateway communications software, terminal emulation software, and good management utilities. Features the ability to distribute many LUs among network stations.

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ICOT netPATH/B SNA-3270

List Price: With SDLC interface card, gateway software, and terminal emulation software: for 8 LUs, \$1,595; for 16 LUs, \$2,595; for 32 LUs, \$3,595; for 3279 S3G graphics emulation option, \$395; for host-based file transfer under VM or TSO, \$395.

Requires: Gateway station: IBM PC, XT, AT, or compatibles; 256K RAM. LAN with NetBIOS services.

In Short: The netPATH/B SNA-3270 is a LAN gateway system with optional S3G video and X.25 gateway services. No frills, but relatively small RAM requirements.

CIRCLE 648 ON READER SERVICE CARD

ENGLISH ERROR REPORTS This ICOT gateway lacks the management functions of its sister, the netPATH/A SNA-3270, but it does at least report errors in English sentences. Many of the gateway packages we tested reported problems through cryptic numeric codes. This kind of error-message interpretation is particularly important because the software does not include Trace or other network management functions that help to isolate errors.

The configuration program for the gateway software is menu driven and easy to use. As with all gateway installation programs, you will need to know a few facts about the 3270 configuration of the mainframe computer. The workstation configuration program is also easy to use, but detailed. You'll also need to know the hardware configuration of every station on the network before you wade into this task.

Once installed, the gateway software occupies a relatively small 200K chunk of the RAM in its host PC. ICOT advertises that this means that the machine acting as a gateway has resources available for other computing purposes, but we suggest that you use care in planning this kind of operation.

The terminal emulation software supports two terminal emulation LUs per station and one printer LU per station. A printer attached to a PC through a parallel port can respond to mainframe print jobs, but the software can't address printers attached to the PC's serial port. It does have an application program interface with good support for screen and keyboard interaction, but it lacks support for IBM's HLLAPI or APPC/LU6.2.

X.25 COMPATIBLE Interestingly, this same software works with another ICOT gateway product that communicates over X.25 packet-switch network connections. It is easy to install both an SNA and an X.25 gateway on the same network. You don't have to reconfigure stations or retrain users to connect to mainframe resources over local and remote communications lines.

An optional package for this gateway gives networked PCs equipped with EGA video the ability to display program symbols through IBM 3279 S3G terminal em-



The netPATH/B gateway

software is easy to use;

once installed, it occupies a

relatively small 200K chunk

of the RAM in its host PC.

ulation. Program symbols are stored on the host and include characters of different sizes or font style, special symbols, and other features that can be drawn on the screen. The netPATH/B SNA-3270's network interface board is also available in a version for the IBM Micro Channel architecture.

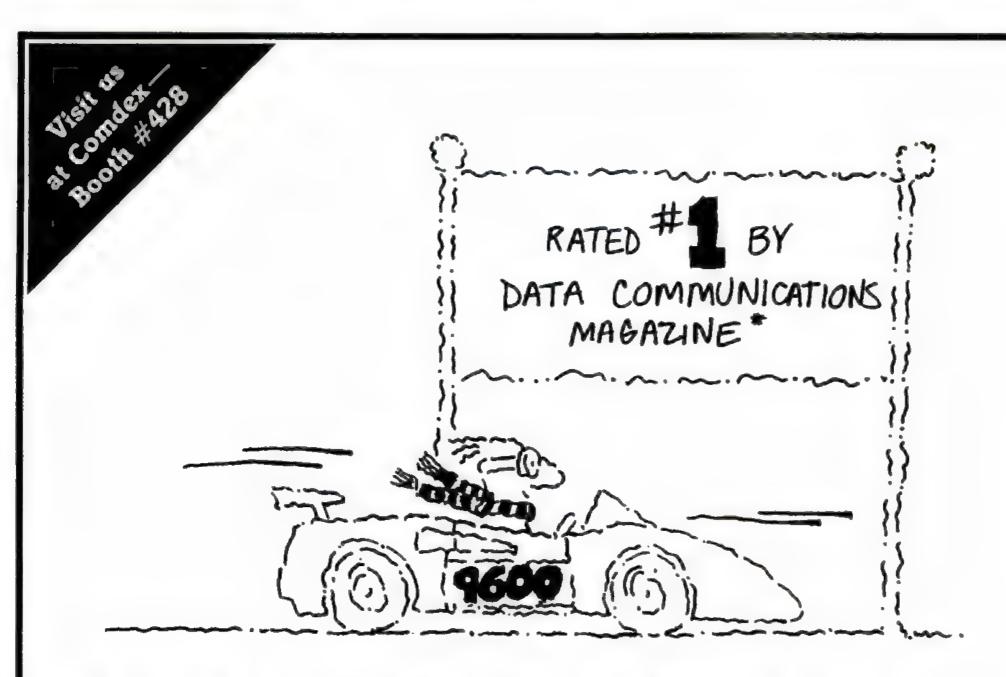
INFORMATION TECHNOLOGIES INC.

ITI LinkUp 3270 Remote GateStation

At \$2,995, the LinkUp 3270 Remote GateStation package from ITI is an excellent value. The full-featured, high-performance system even includes a custom keyboard designed to support both 3270 and DOS functions. The company supports its products well and has been awarded several large government contracts.

Featuring an adapter with its own specialized on-board processor and 56K of RAM, LinkUp can be installed in any machine with a PC-style bus and at least 512K of RAM. The gateway can distribute up to 32 LUs to network stations; any single station can take all the LUs, or they can be distributed over a large number of stations.

NO LU POOLING ITT's gateway software doesn't allow pooling of LUs, so it isn't quite as flexible as some gateways that pass out sessions to network PCs on a



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FACT FILE

ITI LinkUp 3270 Remote GateStation

Information Technologies Inc. 14505 North Hayden Rd. Scottsdale, AZ 85260 (602) 998-1033

List Price: With LAN gateway software, SDLC adapter card, terminal emulation software for up to 32 stations, one special DOS/3270 keyboard, IND\$FILE and editorbased file transfer, \$2,995; additional Link-Up 3270 keyboards, \$295 each.

Requires: Gateway station: IBM PC, XT, AT, or compatibles; 117K RAM (additional 40K for first display station, 9K for each additional display station; 75K for first printer, 16K for each additional printer). Network stations: IBM PC, XT, AT, or PS/2; 70K RAM (additional display station, 9K RAM; printer RAM requirements as per gateway station requirements). LAN with NetBIOS services or 10NET protocol.

In Short: A mature gateway system with good terminal emulation, background printing, and strong vendor support. The 122-key keyboard is designed for both DOS and 3270 terminal users.

CIRCLE 647 ON READER SERVICE CARD

first-come first-served basis. The network administrator can, however, reassign LUs from any networked PC with a few key-strokes.

The software also includes a Trace utility that helps diagnose and isolate communications problems. Once the Trace utility is loaded, you can start running the Trace at any time, even when an application is loaded. After the Trace is stopped, you can review the recorded data exchange. In our test-bed LAN, the gateway software took over 207K.

The LinkUp terminal emulation software can make its host PC look like a remote 3286/3287/3289 printer to the mainframe while simultaneously operating as a 3278/3279 terminal. The software comes with many standard features, including a relatively simple application program interface that simplifies the job of creating log-on scripts and automating other interactive mainframe activities.

Several foreign-language alphabets are also standard, and a character translation table can be easily edited. The software also recognizes a light pen that is sometimes used for special applications. Each workstation must give up almost 94K to the terminal emulation software.

An important function of this gateway system is its ability to accept print jobs from the host computer and run them on standard PC-type printers without disturbing the operation of the PC attached to the printer. The print job can be redirected to a networked printer or to one attached to the gateway machine.

SPECIAL KEYBOARD One LinkUp 3270 keyboard, combining the best features of the early PC AT keyboard and the 3270 keyboard, comes with the Remote GateStation package. It has 122 keys, including special keys for 3270 functions as well as all the keys required for DOS operations: the ten special-function keys are arranged in two vertical columns on the lefthand side where I think they should be; the 24 PF keys are located in two rows along the top like on the 3270 terminal; and there is one Enter key in the usual spot and another under the Right Shift key, where 3270 typists are used to finding it. I didn't like the fact that the CapsLock key is located where Ctrl ought to be, but I was able to remap it. Additional keyboards are \$295 each.

Other options include a package called LinkUp Graphics that gives the PC the ability to display the All Points Addressable graphics capabilities of an IBM 3179G display terminal. You can also add a 3270 Remote Job Entry package that allows you to execute RJE batch processing on the same line as 3270 transactions. The real value of this feature is that it makes it economical to share a leased communications line among both types of applications.

ITI uses a menu-driven installation routine that requires you to know several things about the communications parameters of the 3270 link. Fortunately, they have defaults that match typical installations. At the time of this review, LinkUp didn't have HLLAPI or APPC/LU6.2 interfaces, but the product literature promises that these features are coming soon. If you need to integrate PCs into Unisys (either Sperry or Burroughs systems), IBM System/36, or Honeywell computers, ITI has solutions for these connections, too.

NAS SBeX-3270

The same product that National Advanced Systems calls the SBeX-3270 is also distributed by Artisoft, AT&T, Allen-Bradley, and SCA, as well as by National Semiconductor Corp., NAS's parent company. While the product lacks some of the features and performance of its competitors, it does have the strength of NAS's worldwide support behind it.

The SBeX-3270 SDLC adapter is a full-size board that fits into the expansion slot of a PC or AT bus system, and, not surprisingly, uses a National Semiconductor 32000 32-bit processor. The card comes in two models, one that operates at speeds of up to 19.2 kilobits per second and another that operates at speeds of up to 56 kilobits per second.

The LAN gateway software takes about 184K and includes a simple menu system for software installation and gateway management. The supervisor can closely control the allocation of sessions or allow them to be distributed on a first-come first-served basis.

The terminal emulation software can run any combination of up to five terminal and/or 3287 printer emulation sessions simultaneously. These emulation sessions can run in the background mode, so that



FACT FILE

NAS SBex-3270

National Advanced Systems 9535 Waples St. San Diego, CA 92121

San Diego, CA 92121 (800) 553-9503

List Price: For 8 LUs, \$2,595; for 16 LUs \$4,295; for 32 LUs, \$5,295 (the above includes SDLC adapter card, gateway software, and terminal emulation software for an unlimited number of workstations).

Requires: Gateway station: IBM PC, XT, AT, or compatibles; 300K RAM. Network stations: IBM PC, XT, AT, or PS/2; 256K RAM. LAN with NetBIOS services.

In Short: A widely supported LAN gateway with good features for program developers and system integrators. Not a lot of operational frills; lacks support for extended color graphics.

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Prices quoted are US Domestic suggested retail prices. CIRCLE 122 ON READER SERVICE CARD



Performance Tests: LAN Gateways

These gateway performance tests clearly show that a gateway's software is the key to its speed of performance: some cards loaded with on-board processing were beaten by simpler devices with better software. Software code differences also contribute to the performance variances in the throughput tests with small and large data blocks. Other factors influencing throughput include the network adapter card: It is interesting to see how close and the efficiency of the 3270/SNA gateway adapter card. It is interesting to see how close these systems come to saturating the 19.2-kilobit-per-second line that leads to the front-end processor (FEP); at 17.7 kbps in the Large-Block Throughput test, IBM's gateway came the closest, but all of them put data through effectively.

The IBM PC 3270, Version 3.04, walked away with most of the performance trophies. Other products that did consistently well include DCA IRMALAN SDLC Gateway, Attachmate Extra!, and Eicon Access/SDLC, as well as the "all-in-one" products from Banyan and Harris

discussed in our previous issue.

Keep in mind that the results of the file transfer tests, which appear slow, may not correlate well with the other results because this task is typically handled by a separate piece of software, sometimes running in background mode. Also, although we haven't run the same tests using standard IBM 3278/79 terminals, such dedicated terminals will typically run much faster than PCs that are emulating terminals. This is simply because the dedicated terminals use hard-wired logic instead of running programs.

The LAN gateway performance tests use a mainframe software package called KG3270, developed by innovative Communications, to automatically load and exercise the test-bed's workstations and gateway, allowing a choice from among a wide variety of tasks and data-loading levels. With the exception of the single-user response test, the tests rai without the variations caused by human input.

All tests, except for the file transfer test, stressed the gateway board and software, LAN interface cards and software, and the 3278 terminal emulation software in the PCs acting as terminals. The different block sizes used in these tests caused varying degrees of efficiency in both the LAN packets (or tokens) and the SNA/SDLC response units. The loading tests stretched the resources of the PCs operating as terminals to their limits, and the results equate to the activities of dozens of machines in typical operations."

Each of the six tests talls under one of two categones: throughput or performance time. The throughput tests (Mainframe-to-Terminal Small- and Large-Block Throughput and Terminal-to-Mainframe Screen-Buffer Dump) measure in bits per second how quickly the gateway can send data back and forth between mainframes and PCs emulating terminals: the more bits the gateway can transmit, the better (hence the larger the 3-D bar on the chart, the better). The performance time tests (User Response—system loaded and unloaded—and File Transfer) measure how long it takes the system to perform a given task, hence the shorter times are preferable (corresponding to shorter bars on the accompanying chart).

THE TEST-BED The LAN gateway tests were run on LANs connected over 19.2-kilobif-per-second RS-232C lines using the SNA/SDLC protocols through a 3725 front-end processor to a leased IBM 3084 computer. The maintrame, which was not loaded by any other functions, was configured as two 3081s running the IBM extended architecture (IBM XA) and run under IBM's Virtual Machine High Performance Option (VM/HIPO) and MVS CICS, Version 1.7. The "terminals" connected to the LAN gateways were IBM PC-XTs. (Because we needed access to a dedicated maintrame in order to test the gateway performance of these LANs, we were unable to perform the tests on-site at PC LAN Labs. As a result, we were forced to substitute IBM PC-XTs for the 8-MHz PC ATs we normally use as network workstations. ATs will be the norm for these tests in the future.)

Throughput Tests (Results given in bits per second)

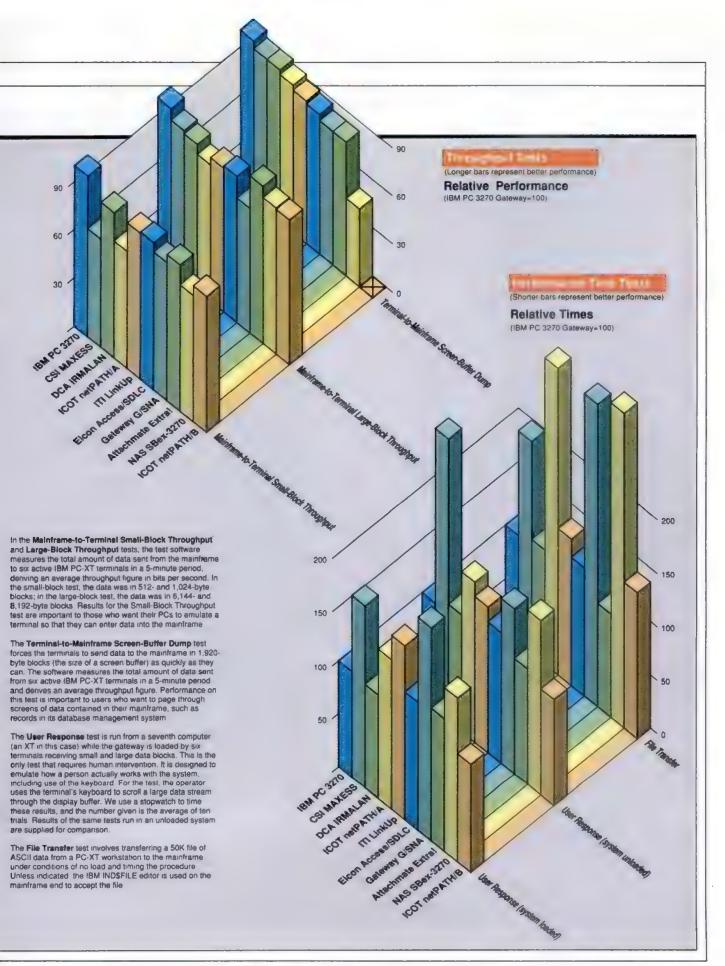
Performance Time Tests (Results given in seconds)

	Mainframe-to- Terminal Small-Block Throughput	Mainframe-to- Terminal Large-Block Throughput	Terminal-to- Mainframe Screen-Burler Dump	User Response (system loaded)	User Response (system unloaded)	File Transfer
IBM PC 3270 Galeway	15,613	17,655	15,991	4	2	60
CSI MAXESS SNA Gateway	10,486	16,420	15,263	8	6	119
DCA IRMALAN SDLC Gateway	14,093	16,084	15,248	4	2	64
ICOT netPATH/A SNA-3270	11,363	14,964	14,785	6	3	172
ITI LinkUp 3270 Remote GateStation	14,163	15,771	14,258	7	3	82
Elcon Access/SDLC	14,291	16,027	14,003	\$	3	72
Gateway Communications G/SNA Gateway	13,386	13,671	13,398	9	3	170
Attachmate Extra!	14,178	17,294	13,393	6	2	58
NAS SBex-3270	12,316	16,060	7,733	7	и	177
ICOT netPATH/B SNA-3270	13,260	15,940	N/A	5	2	82

tests, write to innovative Communications inc., P O Box 3590, Framingham, MA 01701, or phone the company at (508) 875-4821 or (508) 655-4364.

* To obtain a more detailed description of the procedures and parameters used during the *PC Magazine* LAN gateway

N/A-Not applicable: this product could not complete the test.



the LAN shared printer—or a printer attached to a PC—can print a mainframe job while the PC is doing other tasks. The software emulates the IBM 3278 and 3279 terminals but does not have extended seven-color presentation or extended attributes. It occupies about 99K on each workstation.

The documentation includes a lot of information for systems programmers. The terminal emulation software responds to the application program interface that IBM defined for the 3270PC.

In the performance arena, the SBeX-3270 software did not burn up the track. The SBeX representatives present during the test worked with the software, and the times shown on the performance tests represent the best of several runs.

3COM CORP. CSI MAXESS SNA Gateway

After purchasing CSI this summer, 3Com Corp., the networking industry giant, decided to scrap the LAN gateway it had in development and instead began actively marketing the MAXESS SNA Gateway. With good reason: this powerful gateway offers features-rich software and excellent documentation.

The nice thing about the CSI MAXESS



FACT FILE

CSI MAXESS SNA Gateway

3Com Corp. CSI Division 2125 Hamilton Ave.

San Jose, CA 95125 (408) 559-1118

List Price: With SNA SDLC communications card, gateway software, terminal emulation software with unlimited license for LAN workstations, HLLAPI interface, and LU6.2 API support, \$4,995

Requires: Gateway station: 1BM PC, XT, AT, or compatibles; 256K RAM. Network stations: 1BM PC, XT, AT, or PS/2; 512K RAM. LAN with NetBIOS services.

RAM. LAN with NetBIOS services.

In Short: A full-featured LAN gateway bundled into a package with a single price. The package includes interfaces for IBM HLLAPI and APPC/LU6.2 programs.

CIRCLE 652 ON READER SERVICE CARD

product line is that it includes everything you need in one package and at one price. For \$4,995, CSI sells you the gateway card, integrating gateway software, and workstation terminal emulation software that can be copied onto all the network stations.

STOP AND LOOK TWICE CSI's gateway communications hardware contains powerful processing potential: when you notice that the LAN gateway card you are inserting into an expansion slot carries its own 80286 processor and 512K of RAM, you stop and look twice. All of that processing horsepower didn't put the MAX-ESS SNA gateway on the top of the performance-test charts, but it did finish well.

Because the gateway communications card carries its own RAM, the gateway software takes about only 57K in the PC AT hosting the SDLC communications card. This makes it easy to use that machine simultaneously as a gateway and as a network station. However, we recommend that you use this option only if you ensure that no one will turn off, lock up, or reset the gateway machine.

The gateway software features communications management functions that alert users to any problems on the link to the host, and they trace and monitor host sessions for auditing or troubleshooting purposes. The alerts generated by this program can be accepted and used by IBM's NetView network management software.

The MAXESS SNA Gateway lets workstations run both standard 3270 terminal sessions and LU6.2 program-to-program sessions at once. Up to 32 concurrent sessions are supported by the gateway, and all 32 can theoretically be used by one workstation—if it has enough RAM.

The workstation terminal emulation software also includes IBM's High-Level Application Program Interface (HLLAPI). As you'd expect from all of these features, the workstation software occupies over 300K of RAM, but you can easily unload the emulation software if no other memory-resident programs are loaded after it.

HELPFUL HINTS CSI offers five excellent manuals, including HLLAPI and LU6.2 programming guides. All are well written, tabbed, indexed, and full of help-



Attachmate Extra!

This series of reviews proves that the LAN gateway industry is mature and competitive. There are several excellent LAN gateway products to choose from. Your buying choice might be influenced more by the amount of vendor or dealer support you expect to get than by the number of LUs available.

For most installations, you can reach for a product from ITI, IBM. CSI, or DCA with equal confidence. If you want to integrate X.25 services too, you can reach for products from Gateway or Eicon. But if you want both good service and an impressive list of features, pick up the box containing the Extra! 3270 gateway from Attachmate. That vendor's product combines an excellent performance with utilities and frills that end users and programmers can appreciate. The Attachmate Extra! 3270 gateway really is something extra.

ful hints; the sections on troubleshooting are particularly helpful. The on-line help is also clearly written and pertinent to the function being performed.

CSI advertises that the MAXESS SNA Gateway can be installed in 30 minutes. However, we believe the claim holds true only if you have all of the information about communications parameters at your fingertips. The Gateway Manager program is a series of menus that takes you step by step through the SNA, SDLC, and NetBIOS configuration. Unless you are very comfortable with SNA SDLC communications, you will want help from the mainframe systems programmer.

Although the exact relationship between CSI and 3Com is still being hammered out, the addition of the people and resources of 3Com to the support of CSI's products should make any buyer confident that the CSI MAXESS SNA Gateway solution is a smart choice.

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LAN2855	286	1/2	SCSI
LAN335E	338	16	ESERI
LAN650E	651	16	ESEN
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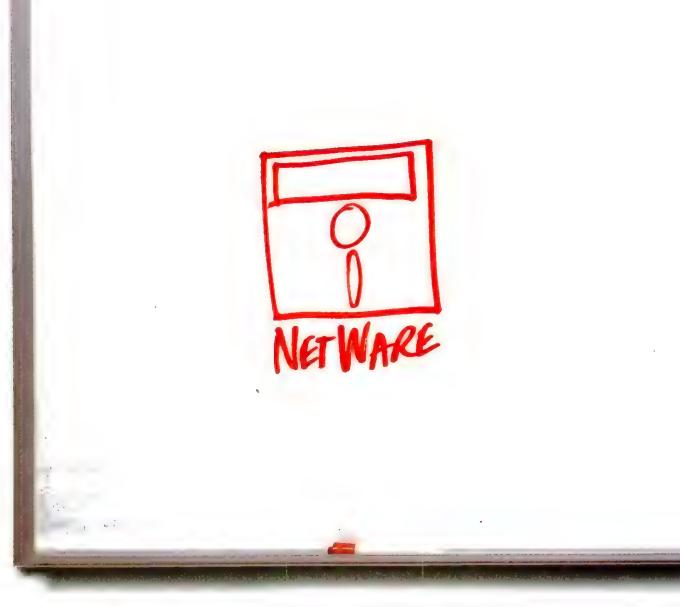
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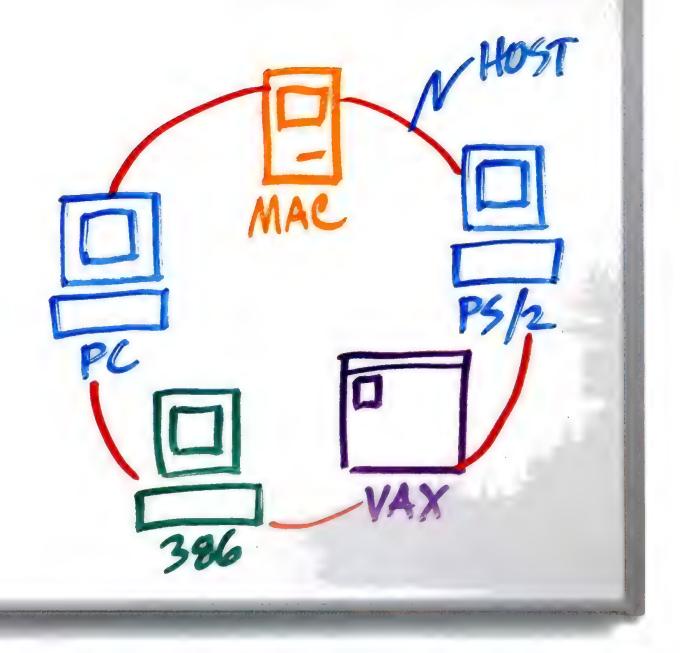
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For network solutions, you should be seeing red.

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Logitech HiREZ TM	320	Yes	Provided	Provided (complex procedure)	15 must be compiled								
MicroSoft Mouse TM	200	Yes, when used as bus	Provided	Provided (complex procedure)	ready to use								



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Printing the Perfect Envelope

S

ometime next century, a historian of American letter writing will describe the 1980s as the Era of Technological Incongruity.

Throughout the nation, personal and business letters were written on fast computers and printed by the most advanced laser technology that money could buy. The letters often used proportional spacing and multiple fonts, and sometimes included graphs and images far too exact to be created by the human hand. And these marvels of technical achievement, produced by a system of printer and computer that often cost more than \$10,000, were mailed in envelopes addressed with a throwaway ballpoint pen that cost 39 cents.

That same historian may report that the

Era of Technological Incongruity came to an abrupt end on the day this issue of *PC Magazine* hit the streets.

Everyone who uses Hewlett-Packard's LaserJet printers knows how tricky it is to print an envelope. The printer normally prints text in portrait mode on a page like the one you're reading now, with the lines of text running parallel to the shorter edges of the page. To print an envelope on a LaserJet you have to convince the printer to work in landscape mode, with text parallel to the longer edges of the page. If you cross this hurdle, you have to set new margins, then figure out how to get the printer to switch back to portrait mode when you want to print text again. Most LaserJet users find it easier to keep a typewriter on the desk or a supply of pens in the drawer.

At last, everything you ever wanted to know about getting your HP LaserJet to address and print envelopes.

COMMANDING THE HP LASERJET

If you need to modify some of our macros or if you want to write some printer commands of your own, you'll have to get acquainted with Hewlett-Packard's Printer Command Language. Here's a way to get started.

You can make a LaserJet print by sending it the same raw ASCII text that you send to lesser printers. But to make it sing, you have to learn to speak its language.

Hewlett-Packard didn't make that an easy task. Its PCL (Printer Command Language) codes rank among the most obscure and arbitrary this side of the WordStar manual. A few codes have some mnemonic relation to their meaning, but if you expect as much from the others, you're in trouble. The Left Margin command ends with L, but the similar-looking command that ends in R sets the number of a vertical Row. The Right Margin command ends with M.

Application programs normally shield you from the complexities of the HP codes, and you can use most of our macros without knowing anything about PCL. But if you want to modify these macros or write some printer commands of your own, you'll need a few spare hours and a copy of HP's Technical Reference Manual for the LaserJet II, or, for the earlier models, the LaserJet Printer Family Technical Reference Manual. A summary of PCL codes appears in the user manual for the LaserJets, and this can give you a start.

With a little practice, you can learn to read the syntax of PCL commands even if you don't know exactly what they mean. Each command begins with the

<Esc> character (ASCII 27), followed by either one or two characters, some numerical data, and a final letter. All letters before the end of a command string are lowercase; the printer recognizes the end of the string when it sees a capital letter.

Some macros talk directly to the printer in PCL, rather than relying on an application program or utility to translate. Here's what the commands used in these macros mean.

"<Esc>E" resets the printer to its default margins, page orientation, fonts, and so forth. You should always begin a print job with a Reset command in order to clear out previous commands. And it's good housekeeping to clean up after a print job by issuing another Reset; if you don't, the settings of that print job will remain in effect the next time you send data to the printer.

"<Esc>&11O" sets the page to landscape orientation. You need to issue this command before identifying the font you want to use. "<Esc>&10O" sets the page to portrait mode.

If, as in our macros, you follow this command with additional commands that normally begin with "<Esc>&l", you can use a lowercase "o" rather than a capital "O" and omit the "<Esc>&l". So our second command, after a Reset, consists of

<Esc>&1103h6d14E

After the "10" sets the printer in landscape mode, the "3h" tells it to ask for paper from the envelope feed.

The next command, "6d", which sets the line spacing at the printer's default setting of six lines per inch, isn't really needed after an "<Esc>E" reset, because the reset restores the defaults anyway. But we've included it so that you can change it for tighter or looser line spacing if you prefer.

Now we come to the delicate task of page formatting.

The original LaserJet and LaserJet Plus print an envelope as if it were a rectangular region near the bottom edge of an imaginary 8½- by 11-inch page in landscape mode. To set a quarter-inch top margin for an envelope, you have to tell the printer to set the margin at around 5 inches from the top edge of the imaginary page—because that's where the top edge of the envelope would be found on the page.

The LaserJet II can also use the same basic method of formatting envelopes, although you have to set the top margin for envelopes at around 2½ inches from the edge of the imaginary page. The LaserJet II also understands commands that directly set the page size of four different kinds of envelopes, so you can measure the real margins rather than calculate imaginary ones. Our macros use the method required by the original LaserJet

EFFORTLESS ADDRESSING Our goal in this issue is to make the job of addressing and printing envelopes as effortless as possible. We've focused on the LaserJet family of printers, but our solutions are easily adaptable to any dot matrix or daisy wheel printer. We've written macros for the major word-processing programs—Microsoft Word, WordPerfect,

DisplayWrite 4, MultiMate Advantage, WordStar Professional, and XyWrite III Plus—macros that will find the address in your letter and print it on an envelope while you sip a cup of coffee.

If you don't use one of the major word processors, you're not out of luck. We've prepared macros for two major keyboard-macro programs that let you print an enve-

lope using an address that any application program puts on screen. We've even written a DOS batch file that lets you print an envelope when you aren't using any application program at all. And we've reviewed six separate programs dedicated to the job of printing envelopes on LaserJets and other printers.

You'll still need a typewriter or a pen to

because this makes it easier to modify the macros for any model of the printer.

So, at the end of the "<Esc>&1" string, "14E" sets the top margin (for the LaserJet II) at 14 lines. The capital E ends the command string.

Our next command, "<Esc> &a18L", sets the left margin at column 18. Then "<Esc>(10U" tells the printer to use the IBM PC character set, and "<Esc>(sp10h12vsb3T" is a series of font specifications that make the printer choose its native Courier font. The "sp" (equivalent to "s0p") tells the printer to use a monospace rather than proportional font; "10h" tells it choose a 10-pitch font, "12v" means a font that's 12 points high, "sb" (short for "s0b") calls for a font of "medium" weight rather than thin or bold, and "3T" specifies Courier in particular.

After entering the return address, our macro moves the LaserJet's invisible "cursor" (the position where the next character will print) to the right place to begin entering the recipient's address. The command string is

"<Esc>&a55111R"

The "551" moves the cursor to a new left margin at column 55, and "11R" moves the cursor vertically to the 11th row below the top margin.

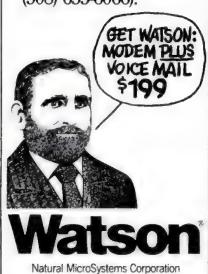
As the macro concludes, its sends a form feed (ASCII 12) to the printer, because the LaserJet won't disgorge a print job until it's told to feed the form-or until you send more lines than will fit on the first page. Finally, we leave everything the way we found it by sending an "<Esc>E" reset.

—Edward Mendelson

fill out multilayered forms, because no one has figured out how to make a laser printer pay attention to the instruction "Press hard-you are making twelve copies." And you may find that a laser-printed address doesn't set the mood for a love letter as well as a handwritten address. But from now on, you'll only handwrite or typewrite your envelopes when you want to.

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CIRCLE 132 ON READER SERVICE CARD



M

any veteran computer users still prefer their first word processor—the kind that is rife with dozens of incomprehensible control codes and that disappeared

from the market before the LaserJet was born. Other users prefer to use their spreadsheet program as a word processor. A spreadsheet is enough for memos and reports; very few spreadsheets know how to print envelopes.

For users like these, a separate envelope program may be the answer. Envelope programs come in two varieties: standalones and pop-ups. You run the standalone programs from the DOS command line after you've exited your other applications. These programs require you to type in the address on a letter, or in some cases they can read addresses from a disk file that contains an address list. Pop-up programs appear on-screen over your word processor or other application and either copy the address from a letter onscreen or let you type an address in a window. Some programs combine both types of operation.

We've reviewed six programs that print envelopes on HP LaserJets. Some work with dot matrix and daisy wheel printers also. And if you use an Epson printer, you may be interested in International Systems Services' \$29.95 Envelope Printer. This standalone program lets you print envelopes in portrait or landscape mode, and it can read addresses from a data file for bulk mailings. Whatever printer you're using, it's time to put the typewriter away.

The Envelope Please . . .

If you're looking for a simple envelopeprinting program with only one tinkly bell and one tuneful whistle, Quaid Software's \$39 The Envelope Please... is worth considering. It works with dot matrix printers and daisy wheels as well as lasers, and it seems to work best with older printing technology. The program comes out of the box configured for Epson printers, but you can reconfigure it for any of 25 other models, including any LaserJet.

The Envelope Please . . . only works in resident mode; it pops up when you press and release the Ctrl key, then Shift, then Alt. This sequence of keys is a uniquely intelligent choice because it's virtually guaranteed not to get in the way of the keystrokes used by any other program. Even if one of your applications uses the Ctrl-Shift-Alt combination, the other program will expect you to press the keys at the same time, and The Envelope Please . . . will remain quiet until needed. And because it only uses 14K of RAM, it probably won't get in the way of your applications.

The sequence of hotkeys brings up a simple frame, which you can move around

Envelope-addressing programs bring macrolanguage convenience to old-fashioned word processors.



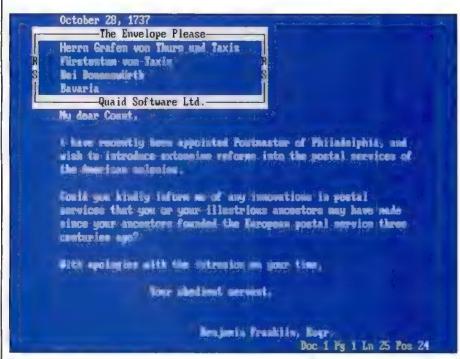


The Envelope Please . . . Quaid Software Ltd. 45 Charles St. East, 3rd floor Toronto, Ontario Canada M4Y 1S2 (416) 961-8243

List Price: \$39 (US\$)
Requires: 12K RAM, DOS 2.0 or later.
In Short: A memory-resident address-grabbing envelope program for all printers: small

and simple, with few options. Not copy protected.

CIRCLE 602 ON READER SERVICE CARD



The Envelope Please . . . has an address-capture screen with an R and an S in the margin, indicating that a return address will be printed on a standard business envelope. The program can print foreign characters in landscape mode.

the screen until it's placed over the address. You can't enter an address into the frame if there isn't one on-screen already. You resize the frame to hug the address by



an excellent choice if you're using a dot matrix and printing standard 10-pitch type, and for basic printing on a LaserJet.

pressing one of the corner keys on the numeric keypad—Home, PgUp, PgDn, or End. When you press one of these keys, the corresponding corner of the frame can be adjusted with the arrow keys. When the frame exactly surrounds the address, you

press Enter, and the printer prints an envelope. The next time you bring up the frame, the program remembers its previous size and position.

The configuration program lets you choose among a small number of options. With impact printers you can select regular or bold print. If you choose to enter a default return address, the pop-up frame will always appear with a capital R on both sides, signifying that the return address will be printed. You can omit the return address on individual envelopes by pressing R when the pop-up frame is on-screen.

CHANGING THE DEFAULT The Envelope Please... uses your printer's default font and expects that font to print out at 10 characters per inch. You'll have to configure the program to change margins if you have a font cartridge that forces the LaserJet to use the cartridge's own fonts as the default instead of the internal Courier font. Hewlett-Packard's M cartridge, for example, sets the default landscape font to 12-pitch Prestige Elite; with this cartridge plugged in, The Envelope Please... prints the address too far to the left—and

positions the return address outside the left edge of the envelope. The program is intelligent enough to center the recipient's address between the margins, so you can experiment until you find a setting that will yield the results you need.

The manual claims that *The Envelope Please*... can print foreign characters in landscape orientation, but the review copy couldn't accomplish this feat with a Laser-Jet, no matter which character set we chose as the printer's default. Quaid Software promises to fix this problem by the time you read this review.

You can choose two envelope sizes, but only the standard business envelope is usable on a LaserJet. The large-envelope option will print 9½- by 12-inch envelopes on an impact printer, but you can't fit that kind of envelope into a laser.

The Envelope Please . . . is an excellent choice if you're using a dot matrix printer and printing standard 10-pitch type. And for basic no-frills envelope printing on a LaserJet, it may be exactly what you need.

ERMAsoft Laser Envelopes

Even an envelope-printing program can have a split personality. E.R.M. Associates' \$49.95 ERMAsoft Laser Envelopes somehow manages to combine the most flexible, imaginative envelope printing available anywhere with the most confusing, recalcitrant menus and configuration program we've seen in a long time. Fortunately, you only have to run the configuration once, and you can get used to the menus.

After that, ERMAsoft lets you print envelopes in any style you like. This program is designed to accomplish only one thing—printing envelopes on a Laser-Jet—and it does this in great style. If all you want is the LaserJet's plain-vanilla Courier font, you can get it without asking. But ERMAsoft also lets you use soft fonts or font cartridges to print envelopes in any typeface you choose—and you choose fonts from a list of names, not by entering obscure codes. If you want to impress a client, you can use a handsome traditional typeface. If you want to send a ransom



Backing up your data doesn't really take an eternity, it just seems that way.

Unless you have an Irwin minicartridge tape backup system.

In which case you don't think about eternity. You think about what's for dinner and how you just might

beat the rush hour.

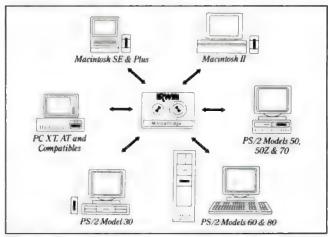
Because our EzTape* software lets you automa-

tically store exactly the data you want, whenever you want.

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So instead of heading for a case of floppies at day's end, you can head





With an Irwin minicartridge system you can easily share data around the whole office. Even among different kinds of computing systems.

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EzStart" gives you set-and-forget programming. Up to 64MB of automatic backup every evening, every weekend — whenever you want.

Another accomplishment that's ours alone.

All of which may explain why our systems are the hands-down favorite over all others combined.

So call 1-800-BACKUP1 for the Irwin dealer nearest you. Making backups may never become your favorite thing to do.

But an Irwin system could become your favorite way to do it.



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CIRCLE 219 ON READER SERVICE CARD

ENVELOPE PRINTERS

note and don't have time to cut out individual letters from the newspaper, you can switch among four different fonts in the same envelope—even in the same word.

You can also print three different sizes of envelopes and modify any of those sizes to suit your needs. You can adjust the default address position by tiny fractions of an inch-although LaserJets normally place the address at a slightly different point on the envelope every time they print. And ERMAsoft has different default settings for each member of the LaserJet family and for the Okidata Laserline 6.

ERMAsoft runs only as a standalone program, so it can't pop up over your word processor like its memory-resident rivals and snatch an address directly onto an envelope. The package includes a small memory-resident address grabber that you can use to grab addresses from a word processor, but you have to exit the word processor, crank up ERMAsoft, and import the addresses before you can start printing. The grabber occupies as little as 3K of RAM, depending on how many addresses you expect to grab.

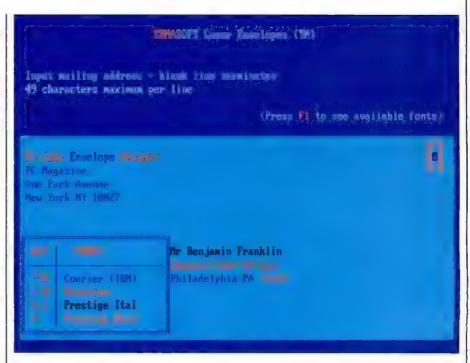
NO DUMMY When you run *ERMAsoft*, a dummy envelope appears on-screen, complete with a smiley face on an electronic stamp. You can use or omit a default



hen you run ERMAsoft,

you can choose up to four different fonts for each envelope.

return address, type in a different return address, or change the default. You then type in the recipient's address, but you have to be careful when editing. If you repeatedly cursor up to a preceding line and then press Enter to return to the line below, the program will think you're finished typing the envelope and proceed to the print menu before you're ready. Apparently ERMAsoft thinks you're through typing



The address on this ERMAsoft-printed envelope uses four different fonts. Each one is represented on-screen by a color keyed to the font name listed on the font menu.

the address when you have pressed Enter a certain number of times, and doesn't check to see whether you've reached the bottom of the address field.

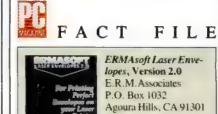
If you've specified cartridge and soft fonts when configuring the program, you can choose up to four different fonts for each envelope. While typing or editing, you can change fonts by pressing an Altkey combination that corresponds to one of the fonts listed in a pop-up menu. Use this feature with restraint if you want your correspondents to take you seriously.

When you've finished printing an envelope, you can print another just like it or change the return address, the recipient's address, or both.

SPLIT PERSONALITY ERMAsoft's envelope-printing menus are relatively easy to navigate. But the configuration program is a combination of maze and nightmare. It will work if you keep banging keys, but the keys listed on the menu don't do what they're supposed to do. I never did figure out how to change the default font without starting over.

Still, if you seriously want the ultimate

LaserJet envelope—one that lets you use the 10-point Palatino Bold font for the return address, 12-point Helvetica Light for the addressee, and 18-point Blippo for the ZIP code—ERMAsoft Laser Envelopes is the only way to get it. And, of course, ER-MAsoft also prints envelopes in Courier, if you're feeling businesslike.



(800) 288-ERMA

List Price: \$49.95 Requires: 256K RAM, DOS 2.0 or later.

In Short: This standalone program comes with a TSR address-grabber and offers every conceivable way to print envelopes on a LaserJet, including the use of multiple fonts. But it is marred by confusing configuration menus. Not copy protected.

CIRCLE 699 ON READER SERVICE

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.

One of the most important reasons for buying our new LaserJet IID printer is on the other side of this page.



The latest member of the HP LaserJet printer family prints on both sides of the paper. But that's just the icing on the cake.

The LaserJet IID printer is full of new ideas for making paperhandling easier and more efficient

An envelope feeder accessory, for one. Instead of having to feed envelopes manually, our new printer does it automatically.

You wanted more paper trays. So the LaserJet IID printer has two of them, each with a 200-sheet capacity. Give us more fonts, you said. And LaserJet

Series II compatibility. Done!

So now you have a choice of two HP LaserJet printers. Both with that superb quality for text and graphics you've come to expect from Hewlett-Packard.

All good reasons to call 1-800-752-0900, Ext. 297A for the name of your nearest dealer.



KEEPING YOUR LASERJET WELL FED

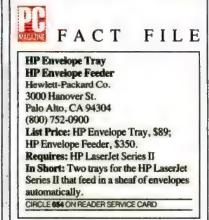
Does your wrist ache from handfeeding envelopes into your Laser-Jet? Use a special envelope tray that lets you feed a sheaf of envelopes automatically.

For the LaserJet Series II, Hewlett-Packard offers an \$89 Envelope Tray that holds fifteen envelopes at a time. When you pull out the standard paper tray and plug in the Envelope Tray, the printer automatically recognizes the size of the envelope in the tray.

To use the envelope tray effectively you'll need software that supports it. The vendors of most major word processors will supply printer drivers for the Envelope Tray on request.

For many small businesses the Envelope Tray is just the ticket, but larger businesses will prefer the \$350 Envelope Feeder for the LaserJet Series II. This holds 50 envelopes and allows you to print letters and envelopes alternately without standing over the printer and feeding envelopes or switching trays.

-Edward Mendelson

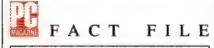


Grab Plus, The Envelope Printer

Don't tell the author of *Grab Plus*, *The Envelope Printer* that the competition charges more than twice as much as he does for envelope-addressing programs, and they don't even include all of the same features. He might get ideas.

ZPAY Payroll Systems' \$15 memoryresident envelope program doesn't let you
use a different font for each number in the
ZIP code, but it knows how envelopes
ought to look, and it can print them on virtually any printer. ZPAY even offers a special version that prints PostScript-based
envelopes—a feat no other program even
attempts.

The software includes a nonresident database program that lets you store addresses to be grabbed by *Grab Plus*. You can tag each address with one of five different markers and use all the addresses tagged with a marker for a bulk mailing. The database imports comma-delimited ASCII files from any other database. A single keystroke can rearrange address fields at print time to put a personal name before or after a corporate address.

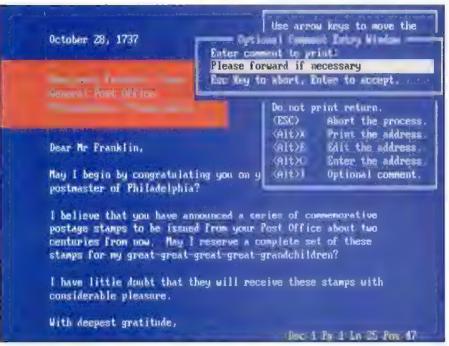


Grab Plus, The Envelope Printer ZPAY Payroll Systems c/o Paul Mayer 3516 Ruby St. Franklin Park, IL 60131 (312) 671-3130

List Price: Shareware (\$15 registration fee)
Requires: 256K RAM, DOS 2.0 or later.
In Short: A memory-resident shareware program with many options, including an address database. *Grab Plus* can print envelopes on virtually any printer, including PostScript. Not copy protected.

CIRCLE 696 ON READER SERVICE CARD

WINDOW ADDRESSING Grab Plus occupies a moderate 36K RAM. When you pop it up over your word processor, it puts a movable window on-screen for capturing the address. You move the window with the arrow keys and resize it with function keys. You can also edit the address, type in an address if you aren't grabbing one from a letter, and add a comment that will print in the lower-left corner of the envelope. A keystroke lets you choose be-



When using Grab Plus, you move the address window with arrow keys and resize it with function keys. With one keystroke, you can choose between large and small envelopes or between two return addresses stored in a configuration file.

TOP OF THE LINE THAT MEETS YOUR BOTTOM LINE



EXPRESS 386 20 MHz WITH ZERO WAIT STATE. \$2,499

Our Standard Features:

- Intel 386 Processor
- 1 MB RAM Included!
- 16/20 MHz w/Zero Wait Motherboard Accommodates up to 4MB Onboard RAM
- 200 Watt Power Supply
- Enhanced 101 Key Keyboard
- Full Size Case with Hard Drive, Power, and Turbo

- One 1.2MB High Density
- Amber Monochrome Monitor
- 1 Serial Port
- Monochrome Adapter Card
- Drive Controller

Floppy Drive

1 Parallel Port

Hercules Compatible

Hard Drive and Floppy

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EGA SYSTEMS:

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Express 88: for Standard EGA Configuration Add \$442 For Express 286/386 Multisync II Configuration Add \$690
For Express 286/386 Standard EGA Configuration Add\$441
SOME OF YOUR HARD DRIVE OPTIONS:

Prices reflect a 3% cash discount. Mastercard, VISA, University and Fortune 1000 PO's welcome.

Express 286, 386 Systems shown with NEC Multisync II monitors. Intel is a registered trademark of Intel Corporation. MS-DOS and OS/2 are registered trademarks of Microsoft Corp.

ou're looking for a computer that's COMPATIBLE with existing equipment and runs MS-DOS® software now, and OS/2® software in the future...

You're looking for an AFFORDABLE computer system. One that allows you to easily include additional high quality components (tape back-up units, hard disc drives, VGA, optical disc drives, etc.).

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You're looking for U.S. Express! U.S. Express carries a complete line of computer systems including our Express 88, Express 286, Express 386 as well as monitors, tape back-up units, floppy and hard disk drives, controller cards, video cards for both today's and tomorrow's microcomputer users.

Our sales and technical staffs are here to assist you in any way. Every component we sell is covered by a One Year Limited Warranty. And U.S. Express offers Extended Warranty options. Call your sales representative today for more information!

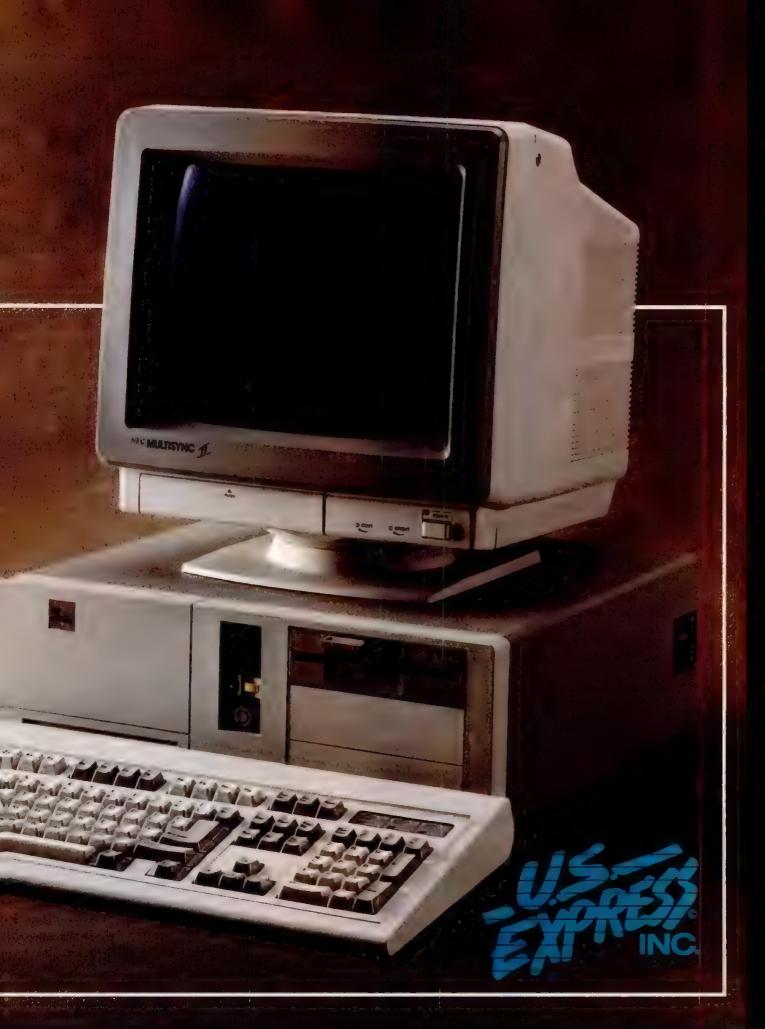
EXPRESS 286 6/12 MHz WITH ZERO WAIT STATE. \$1,099

Our Basic System Features:

- Intel 80286 Processor
- 512K Dram Included!
- Switchable 6/12 MHz, with Zero Wait State Motherboard Accommodates up to 4MB Onboard RAM
- Amber Monochrome Monitor
- Hard Drive and Floppy Drive Controller
- One 1.2 MB High Density Floppy Drive
- High Quality 200 Watt Power Supply
- Enhanced 101 Key Keyboard
- Hercules Compatible Monochrome Adapter Card
- 1 Parallel Port
- 1 Serial Port
- · Clock Calendar with Battery Back-Up
- Supports Intel 80287 Co-Processor
- Full Size or Desk-Saver Case

Also Available: Express 88 Mono, 640K from \$757!

ADMINISTRATION 313-425-7644



tween large and small envelopes or between two return addresses stored in a configuration file. You can't type in a third, temporary return address while using the program, but you probably don't want to.

The configuration program lets you adjust the location of the address on large and small envelopes and add printer and font

G

rab Plus, The Envelope Printer

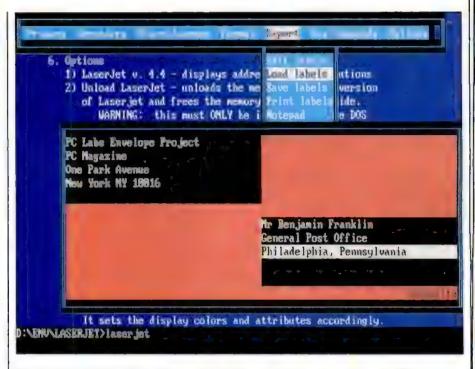
is a RAM-resident program that knows how envelopes ought to look, and it can print them on virtually any printer.

initialization strings. LaserJet and Cordata laser printer initialization strings are already built in.

Because *Grab Plus* is shareware, you can download a copy from a local BBS and see whether you like it. If you decide to keep it, just pop it up to your screen, grab the author's address from the documentation file, print out an envelope, and send him your check.

LaserJet Setup Utility

The only thing wrong with Guy Gallo's LaserJet Setup Utility is that it doesn't fully support the LaserJet II. With any model LaserJet, this program can set margins, pitch, spacing, fonts, and other features, if you're using an application that can't control laser printers on its own or if you simply want to copy a text file to the printer. You can run LaserJet Setup Utility from the DOS command line or pop it up over an application, and every LaserJet owner will find a use for it. But unless you're willing to patch your copy of the program-and we'll certainly tell you how-you can only use it to address and print envelopes on the original LaserJet or



When LaserJet Setup Utility's menus refer to labels, the program means envelopes. This screen pops up when you want to edit an envelope, and the program keeps the same envelope in memory for future use. You can also save the return address or a whole envelope to a file.

the LaserJet Plus printers.

Even if you can't use all its features, this is a program worth having. The price, by definition, is exactly right. The author, Guy Gallo, asks you to download the program from a BBS or get it from a disk library and, if you decide to use it, to "send payment in an amount commensurate with its utility."

We found plenty of utility in LaserJet Setup Utility. Anyone who has ever sent text files to a LaserJet has been frustrated by the wasted paper that results when a printer that starts a new page every 60 lines meets a text file with a page break every 66 lines. LaserJet Setup Utility has a command that makes the printer squeeze those 66 lines to fit on a single page.

SWITCHABLE FONTS The program includes commands to switch among the LaserJet's internal Courier fonts and the more-popular cartridge fonts, and you can store a custom command to switch to any other font or feature that the printer can supply. The program will print a brief font sample on command, so you can make

sure you're using the right font before printing a 100-page file.

For envelope printing, LaserJet Setup Utility pops up a window with room for a return address and a recipient's address. You can save your return address in a file and import it when needed. You have to name the file when you import it, so you can store different addresses in different files.



LaserJet Setup Utility, Version 4.4 Guy Gallo

P.O. Box 344

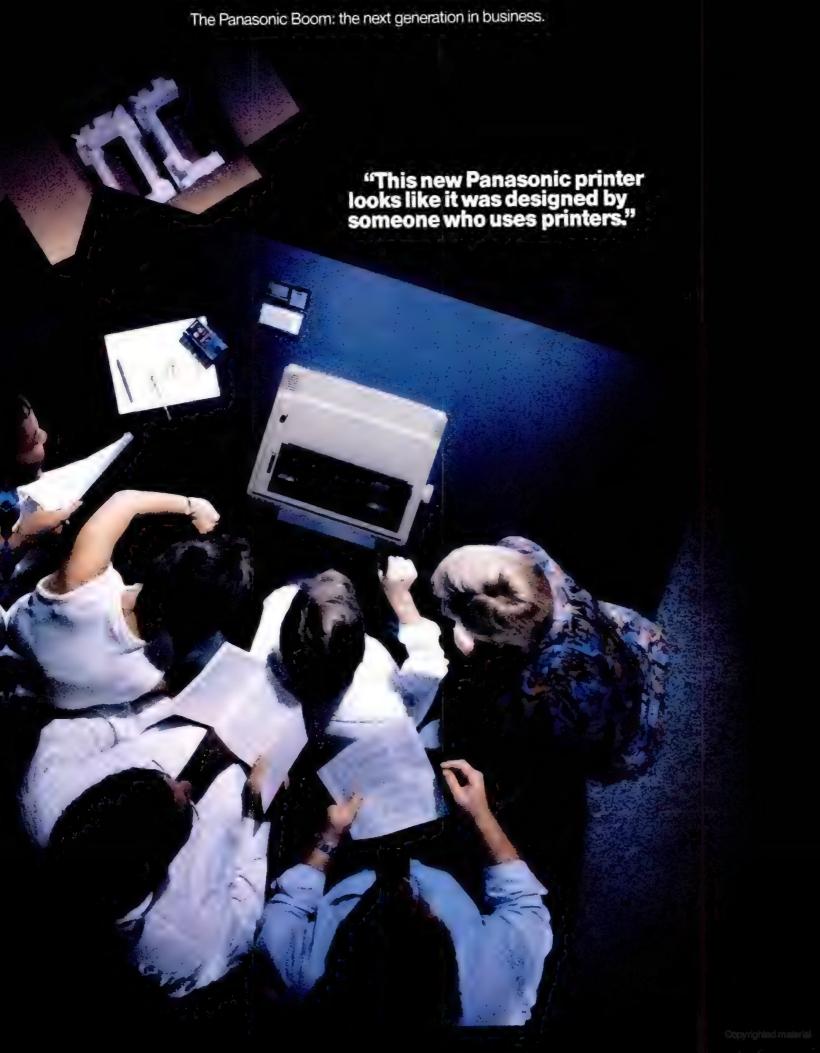
Piermont, NY 10968

List Price: Shareware (voluntary contribu-

tion)

Requires: 128K RAM, DOS 2.0 or later. In Short: A valuable control program for LaserJets, with envelope printing. It can be used as a TSR but doesn't grab addresses from the screen. Not copy protected.

CIRCLE 697 ON READER SERVICE CARD



Introducing the Panasonic^{*} 1124 24-Pin Printer. Designed by

the people who'll use it.

Before we designed the 1124, we talked to customers to find out what features they wanted. And created a printer specially designed for non-software experts. The EZ Set™ Operator Panel allows you to make choices simply and quickly—without having to program any software. This printer puts you in command. And puts the commands at your fingertips.

The ergonomically-designed EZ Set Operator Panel presents you with all the features you use most. There's even a special Macro feature that allows you to easily recall all the panel settings for three different formats at the press of a button.

Selectable on the EZ Set "Operator Panel:

- Fonts: 1 Draft and 5 Letter quality
- Pitch: Choose from 6
- Form Length: From 8" to 14"
- Lines per Inch: 3, 4, 6, 7.5, 8, 12
- Margins: Left and right
- II Quiet Mode: Cuts printer noise by 50%
- □3 Macros
- Tunction Mode
- Perforation Cut
- Forward and Reverse Micro Line Feeds
- Memo Load
- MAnd more

The EZ Set™ Operator
Panel puts over 20 features
at your fingertips—
not inside the cabinet.



Put the printer wherever it's most convenient. The 1124 accepts paper from either the rear, the bottom or the front.

Where you put the printer, and where you want the printer, can now be one and the same location. Whether you'll be using single sheets, continuous fanfold, or envelopes.

By flipping open the front panel, you can feed single sheets—either lengthwise or sideways—from the front. Most other printers require you to change your software program for sideways printing. And with an optional automatic cut sheet feeder, you can even feed single sheets through the top.

Fanfold paper can be fed from either the rear, the bottom or front of the machine. Without snaking over, under or around the cables. And a special *Perforation Cut* feature lets you tear off sheets at the perf, yet still begin the next sheet within 1/3" from the top—automatically.

When you're running fanfold—but need to print a single sheet or envelope



in a hurry—the Memo Load feature lets you do it without removing or wasting the fanfold paper.

And Micro Line Feed lets you position your pre-printed forms just where you want them.



The 1124 lets you present your ideas with sharp letter quality and crisp, clear graphics.

The 1124 gives you five letter quality fonts—standard.

And two draft quality. And by combining the fonts, the character sizes and the enhancement modes you have 5500 valid type style combinations right at your fingertips.

And you can do even more. Because the 1124 uses 360 x 360 dots per inch bitmapped graphics to produce special printed effects—every-

Draft Pica
Draft Elite
Courier Pica
Prestige Elite
Bold Proportional
Space
Sans Serif Pica
Script Pica

thing from company logos to line art and photo-like images.
Everything's sharp. Crisply defined. In both draft mode—
at up to 192 characters per second—and letter quality mode—
at up to 63 characters per second.

141

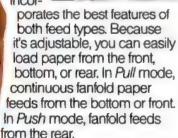
TWO-YEAR LIMITED WARRANTY
PANABONIC PRINTERS
AND ACCESSORIES

AND ACCESSOR

This new "Push-Pull" tractor makes the 1124 incredibly simple to load.

It's not an dinary tractor. Or standard tion feed. And not a cumberne add-on. Instead, this

new flexible design incor-



Michael E. W

In addition, Push mode

allows you to tear continuous forms cleanly, without skipping a form just to advance to the next one.

And this new push/pull tractor and friction feed

system makes it easier than ever to print non-standard paper sizes, like mailing labels, envelopes, multi-part forms, etc.

Two of the 1124's best features, however, can't be found on the EZ Set™ Operator Panel: Terrific value. And a 2-year warranty.

The 1124 is a full-featured 24pin printer. Compatible with the rich software libraries supporting the Epson*LQ-2500 and IBM* Proprinter™X24.

But the 1124 features a 9pin price.

Plus something you'll find on very few printers out there: a two-year warranty* on both parts and labor, from Panasonic.

That makes it a good investment. With excellent investment protection.

The Panasonic 1124 24-Pin Printer. In today's business environment, it's the printer that makes the most sense.

For more information on the 1124 or any of our other versatile, sophisticated printers, just call:

1-(800) PIC-8086.

Panasonic Office Automation

Copiers, Typewriters, Printers, Peripherals and Facsimiles.

Epson is a registered trademark of Seiko Epson Corporation. IBM is a registered trademark, and Proprinter is a trademark of International Business Machines Corporation.

*The complete warranty is available for review at your Panasonic Dealer

The Panasonic 1124 24-pin printer.

Print Method:

Impact Serial Dot Matrix

Print Head and Life:

24 pin (0.2mm wire diameter) 100 million characters (draft)

Print Direction:

Bidirectional (user selectable Unidirectional) Logic Seeking

Print Speed (Matrix):

(Characters per second):

 Draft
 LQ

 Elite 192 cps
 63 cps

 Pica 160 cps
 53 cps

Letter Quality Fonts:

Courier, Prestige, Bold PS, Script, Sans Serif

LQ Character Cell Matrix:

24x30

Printing Sizes:

5, 6, 7.5, 8.5, 10, 12, 17, & 20 characters per inch

Characters Per Line:

40, 48, 60, 68, 80, 96, 120, 137 & 160 characters per inch

Character Sets:

96 ASCII characters; 96 Italic ASCII characters 32 Regular and 32 Italic International characters International characters—13 countries. 159 IBM Special characters—Sets 1 & 2

Bit Image (matrix):

360 x 360 dots per inch

EZ Set™Operator Panel:

Controls over 20 functions including:
Font Lines Per Inch
Quiet Mode
Form Length Perforation Cut
Paper Loading Paper Parking
Macro Settings Margin Settings
Micro Line Feed Default Setting

Line Feed Time:

Approx. 100 msec (with 1/6-inch line feeding)

Tractor Feed:

User selectable push or pull, swivel mount, flat belt

Paper Feed:

Path Method

Front Friction or Pull Tractor
Rear Push Tractor (adjustable)
Bottom Pull Tractor (adjustable)
Top Cut Sheet Feeder (optional)

Paper Specifications:

Continuous: 4.0 to 10.0 inches, 14 to 24 lbs. Single Sheet: 4.0 to 11.7 inches, 14 to 24 lbs.

Envelopes: #10

Copies: Original and 3 non-carbon copies
Thickness: Maximum thickness less than

0.013 inches

Emulations:

Epson* LQ-2500, IBM* Proprinter™ X24

Interface:

Centronics parallel, RS-232C serial (optional)

Buffer:

6K (standard); additional 32K (optional)

Noise Level (LQ mode):

56 dBA (standard mode), 53 dBA (quiet mode)

Environment:

Operating: 50° F to 95° F at 30 to 80% humidity Storage: -4° F to 140° F at 10 to 90% humidity

Reliability:

4,000 hours MTBF

Warranty:

Limited 2 Years—Parts and Labor

Dimensions and Weight:

16.9(w) x 14.1(d) x 5.6(h) inches; 18.7 lbs.

Options:

Automatic Single Bin Cut Sheet Feeder (KX-P36)
RS-232C with Current Loop Serial Interface
(KX-P19)

32K Expansion Buffer Chip (KX-P43)

Epson is a trademark of Seiko Epson Corporation. IBM is a registered trademark, and Proprinter is a trademark of International Business Machines Corporation.



Although the envelope will print in the right position only for the original Laser-Jets, confident users can patch the program to adjust the position for the LaserJet II. (Make a backup copy first.) Use any file-patching program like *The Norton Utilities* or DEBUG, search for the two occurrences of the string "27E" in the file, and change them to "14E". Now your copy is customized for the LaserJet II.

LaserJet Setup Utility can print a file from disk using the settings chosen from its menus. It also includes a notepad where you can create or edit one-page text files. This is a miniature word processor complete with commands for line spacing and underlined, italic, or bold text, and it holds your text in memory if you go out to the main program menu to set fonts.

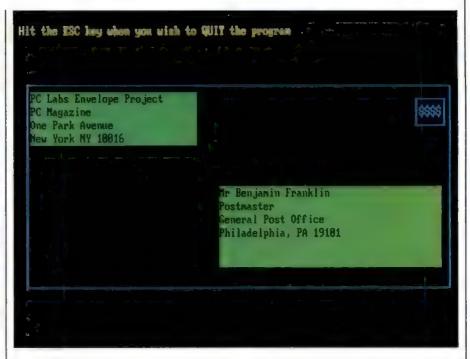
Maybe Guy Gallo's pay-what-it'sworth pricing policy for *LaserJet Setup Utility* isn't such a good idea after all. The more I use this program, the more expensive it gets.

LazrJet Envelope Program

Some programs can do only one thing, and if that's the thing you want done, you don't have to look further. Delta Data Systems' \$19.95 LazrJet Envelope Program prints LaserJet envelopes—no more, no less.

The disk comes with two executable files: ENV.EXE for the original LaserJet and LaserJet Plus, ENV2.EXE for the LaserJet II. Each program takes up 162K on disk. Choose the one you need, wait a few





The LaztJet Envelope Program seems to have alarming ideas about the future of American postal rates. While averting your eyes from the dollar signs, you fill in the return address and recipient's address in the appropriate fields.

seconds while it loads, read the explanatory opening screen, then press a key. The program now displays the outline of an envelope, and you can fill in the return address and recipient's address. If you don't want a return address, press Enter a few times to get past it. Because you can't store a default return address, businesses with printed stationery will find this program more useful than individuals who buy blank envelopes at the local store and have to type in the return address each time.

When you reach the last line on the address screen, the program displays a handy diagram that tells you what you might not know: where to put the envelope, and which end goes into the printer first. You may get tired of seeing it after a few days, but a LaserJet novice will find it useful.

Once you've printed the envelope, you can press a key corresponding to the kind of tray you're using on the LaserJet, and the letter prints. You then return to the envelope screen to type in another address—and perhaps to make alterations to the envelope you just printed.

Until you reach the screen with the

printer diagram, you can break out by pressing the Esc key. In the last screen, however, you have to remember to press Alt-C if you want to quit.

Only one thing about this program has me worried. In the envelope screen, the postage stamp is represented by a box containing four dollar signs. What does Delta Data Systems know that I don't know about upcoming changes in postal rates?

NVelope

NVelope comes with myriad menus that offer just about any envelope-printing option you can imagine. I couldn't find an option to make the printer imitate my handwriting instead of using a font, but it may be lurking somewhere in a submenu I haven't discovered yet.

Paul Mace Software's \$49 envelope processor works either as a standalone program that you run from the DOS prompt or as a memory-resident pop-up. In its TSR mode, it seizes control over a whopping 97K of RAM.

NVelope is versatile enough to work



You can choose from a few dozen different envelope sizes in Paul Mace Software's NVelope, but you'll always have to cursor down to "Sideways Print" to print a standard envelope with a LaserJet.

with almost any printer. But, although it remembers which printer you use, it won't let you change the program defaults to match the way you're most likely to use that printer. Every time you want to print an envelope on the LaserJet, you have to move the cursor to the Sideways option on the Print menu. This seems a needless an-

FILE NVelope, Version 1.02 Paul Mace Software Inc. 400 Williamson Way Ashland, OR 97520 (503) 488-2322 List Price: \$49 Requires: 256K RAM, DOS 2.0 or later. In Short: This program has options for everything you can do with or for an envelope, including bulk mailings and ZIP-code databases. But the menus are needlessly awkward and complex. Not copy protected. CIRCLE 695 ON READER SERVICE CARD

noyance in an otherwise powerful and effective program.

DATABASE OF ZIP CODES NVelope fills your screen with a diagram of an envelope and lets you type in an address or grab one from an application. You can use a default return address or, if you're on the move a lot, type in a temporary substitute. Any recipient's name and address that you put on an envelope can be added to an address list and reused later. If you don't know the recipient's ZIP code, just leave the cursor on the last line of the address, press a key, and let NVelope supply the ZIP from its database. If you use the ZIP code data files that come with the package-one file per state-you can find the correct code for any town that has only one zone; for large cities you get only the first ZIP code that would appear in an official directory. Mace intends to offer full ZIP code databases that will let the program identify the code from the street address.

Once you have begun to compile an NVelope address list, you can use the program for bulk mailing. Call up the list and tag as many names as you like, or let the program print them all. NVelope will print the addresses on a stack of envelopes or on sheets of labels.

NVelope's Size menu offers 32 different envelope sizes and 16 layouts for labels-including name tags and three-byfive cards, options that you'll probably choose with impact printers rather than LaserJets. The program remembers the envelope size you used last and will continue to use it until you choose another.

NVelope's default hotkey is Alt-Gray Plus, and you can only replace this with Ctrl-Gray Plus, Alt- or Ctrl-Gray Minus. Ctrl-5 (on the number pad or top row), or Ctrl-0 (on the top row). While this range of choices is probably large enough to avoid most conflicts, some word processors use all those keys for their own functions.

One of NVelope's more obscure menus is called Control Printer. The manual doesn't explain that the numbers next to Horizontal and Vertical refer to characters and lines per inch. You can open a window and replace the command strings that the program sends to the printer, although you can't edit existing strings. The manual doesn't explain that you enter the crucial Esc character by typing "^[". If you understand LaserJet font codes, you can make the program use soft or cartridge



f you use the ZIP code data

files that come with NVelope—one file per state—you can find the correct code for any town that has only one zone.

fonts. You can even edit the codes to make the Print option give you landscape rather than portrait mode. But you'll still have to choose either Print or Sideways Print from the Print menu every time—a needless flaw in a powerful program.





Working with Word Processors



Ready-made macros

add new smarts

processors.

to the major word

he major word processors are robust, feature-laden programs that simplify most of the mechanics of text preparation. But if there's one undertaking that gives pause

even to experienced word processor users. it's figuring out how to get these programs to address and print envelopes. To simplify matters, we've prepared envelopeprinting macros for the market leaders among word processing programs and for the programs that ranked as Editor's Choices in our word processing blockbuster issue (February 29, 1988)—six programs in all.

These two categories overlap: Microsoft Word and WordPerfect are both market leaders and Editor's Choices. Each proved its worth by making it easy to write a macro that finds the address and prints an envelope in landscape mode. WordPerfect, Version 5.0—the newest release—includes a basic envelope-printing macro that you can use as an alternative to ours. The other three market leaders, Display-Write 4, MultiMate Advantage II, and WordStar Professional, made matters more difficult. Each forced us to write macros that are less powerful and flexible than our Word and WordPerfect creations.

Of the remaining Editor's Choices, Xy-Write III Plus presented the greatest technical challenge. In typical XyWrite style, we solved the problem by using direct control over the printer instead of working through the menus and built-in conveniences provided by similar programs.

The other two Editor's-Choice word processors, Nota Bene and Q&A Write, both have envelope-printing functions built right in.

ALL THE ANSWERS Nota Bene's designers seem to have thought of everything. If there's any job a word processor might conceivably do, Dragonfly Software's \$495 XyWrite-based powerhouse probably has a menu offering a half-dozen ways of doing it.

When you want Nota Bene to print an envelope, simply place the cursor anywhere in the address, then press F1 for the menu system, P for Print, and E for Envelope. Nota Bene then presents a screen with nine options. You can use businessor personal-size envelopes or enter the measurements for a nonstandard size. And on each size, you can automatically include your business return address, home address, or no return address at all. Nota Bene prints envelopes in landscape mode with Hewlett-Packard LaserJets and most PostScript printers.

Q&A Write's claim to fame is its exceptional ease of use. Symantec Corp.'s \$199 program makes you press a lot of keystrokes to print an envelope on a LaserJet, but every step is on the menu, and Q&AWrite finds the address for you automatically.

To print envelopes with a LaserJet using Q&A Write, you have to install the "LaserJet (Envelope)" or "LaserJet II (Envelope)" printer driver in addition to your standard driver. When you're ready to print, you go to the print menu, choose the Envelope option that is listed under Line Spacing, switch to the printer number that you used when you installed the Envelope driver, and print. You'll have to change these settings back to your normal settings before printing the letter itself.

All this takes about a dozen keystrokes, and Q&A Write makes it easy to store them in a macro. Just press Shift-F2, choose the Define Macro option from the menu, press the key on which you want to store the macro, and enter the keystrokes that print the envelope and restore the standard settings. Press Shift-F2 when you're done, and save the macros to disk.

LETTING DOS DO IT

Old Faithful can match any macro or word processor at addressing envelopes on a LaserJet.

You don't need a macro—or even a word processing program—to address envelopes on your LaserJet. A simple DOS batch file, ENVELOPE.BAT (see Figure A), will do the trick in seconds, provided you first create a couple of "template" files (Figures B and C) with the codes that make the LaserJet print in landscape mode and set the correct margins. You only have to create the template files once.

To use this set of files, type ENVE-LOPE at the DOS command line and then, when prompted, type in the recipient's address. DOS only lets you edit by backspacing over your errors, and you can only edit the line on which you're typing at the moment. You can't go back to the preceding line, although you can break out and start the process over. When you finish typing the address, press F6 and Enter, and collect your envelope from the LaserJet.

READY, GET SET, TYPE Type the three files on the next page using any text editor or word processor that produces pure ASCII files. DOS purists can even use EDLIN. Modify TEMPLATE. AAA, which is shown in Figure B, to print your return address on the lines where you want it to appear, or omit the return address entirely.

Wherever the two TEMPLATE files have "<ASCII 27>" (the Escape character), hold down the Alt key and type 27 on the number pad. Depending on the editor you use, you will see a left-pointing arrow or "^[" or "^V[" in the text. Use the same method to type <ASCII 12> (the form-feed character), which will produce either the female symbol or "^L" or ""VL" in the file. In the two TEMPLATE files, press <Enter> only where the printed version explicitly says to do so.

Because the batch file selects the IBM



The instructions in our batch file are fed to the screen via the ECHO command. Hidden from the screen is the COPY CON command, which you use when entering the address.

character set for the LaserJet II's native Courier font, you can print foreign characters by entering their ASCII numbers. Just press the Alt key and type the ASCII number on the numeric keypad. You can't do this with the original LaserJet or LaserJet Plus, and for these printers you'll have to replace "10U" with "8U" in the first line of TEM-PLATE.AAA. Also, with the original LaserJet and LaserJet Plus, in the second line of the file replace "14E" with "28E" and replace "18L" with "15L"; near the end of the file, replace "551" with "521".

If you add the full pathnames of the two template files to the batch file, you can use these files regardless of what disk or directory you are currently in. Otherwise, you should be in the directory in which you keep all three files.

DOS virtuosos will recognize that the ENVELOPE.BAT file shown in Figure A could be made more elegant by reducing the last three lines to a single line:

copy template.aaa+con+template.bbb prn

Doing it this way would cut down the number of disk reads and writes needed to complete the batch file, although the time you would save could be measured in milliseconds. And if you tried to break out of this version of the batch file by pressing Ctrl-Break, the contents of TEMPLATE. AAA would already be in the printer's memory and would scramble your next print job. Safety is more important than elegance.

-Edward Mendelson

ENVELOPE BAT

```
echo off
cls
echo:
echo
              LaserJet Series II Envelope-Printing Batch File
echo:
echo
              PC Magazine
echo:
              1. Insert the envelope in the printer's envelope slot
echo
              2. Enter the address below
echo
              3. Press F6 after typing the address (same line OK)
echo
echo
              4. Press Enter
echo:
              or Press Ctrl-Break to cancel
echo
echo:
echo:
copy con env.tmp > nul
copy template.aaa+env.tmp+template.bbb prn > nul
del env.tmp > nul
echo:
```

Figure A: Rather than use a keyboard macro or a word processing program, you can use this simple DOS batch file, ENVELOPE.BAT, to address envelopes on a LaserJet Series II in seconds.

TEMPLATE.AAA

```
<ASCII 27>E<ASCII 27>&llo3h6d14E<ASCII 27>&a18L
<ASCII 27>(10U<ASCII 27>(sp10h12vsb3T<Enter>
Your address here<Enter>
Or here...<Enter>
<Enter>
<Enter>
<Enter>
<Enter>
<Enter>
<Enter>
<Enter>
<Enter>
<ASCII 27>&a55111R
```

TEMPLATE.BBB

<ASCII 12><ASCII 27>E

Figures B and C: Create these template files in a text editor that lets you include lower ASCII characters like ASCII 27 (the Escape character) and ASCII 12 (the page-break character). Press Enter or insert a CR/LF pair *only* where the listing has <Enter>. You don't need to enter all the lines in the return address, only as many as you need.

PFS:Professional Write, Software Publishing Corp.'s \$199 word processor, has a remarkably easy-to-use envelope-printing option. At the print options menu, just choose E for envelope instead of the default D for document. With the current version, this option works with LaserJets as well as for other printers.

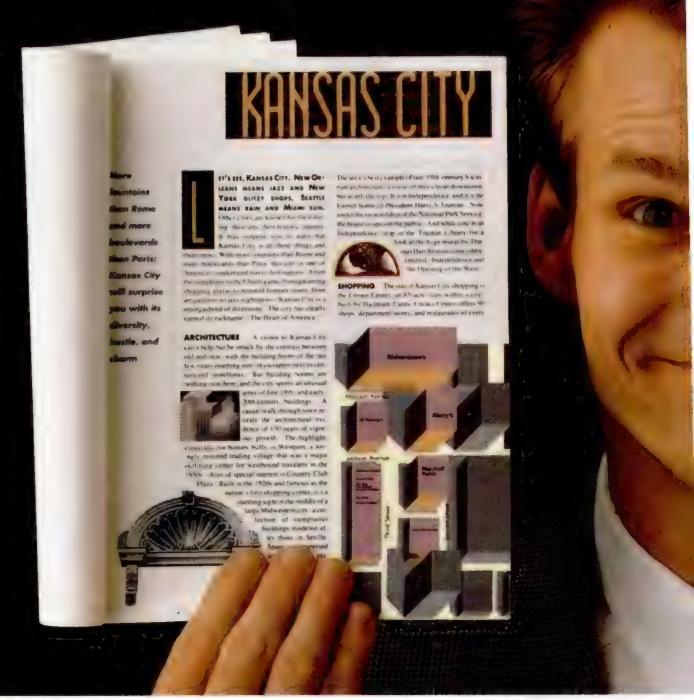
ABOUT THESE MACROS Our macros are designed to make envelope printing effortless. All you have to do is type them in or download them from PC MagNet. Then, when you're finished typing a letter, you can print an envelope on a LaserJet by pressing one or two keys—and you won't need to retype the address or even mark it as a block.

You don't have a LaserJet? You can still use these macros. Simply omit the commands that tell the LaserJet to print in landscape mode, and modify the margin settings; these macros will make envelope printing equally effortless with dot matrix and daisy wheel printers.

Each macro automatically finds the address in your letter and then prints a business-size envelope with the address in the right place. All the macros (except those that have to work within the constraints of DisplayWrite 4 and MultiMate Advantage II) are also designed to print your return address—or your name above or below a corporate letterhead. You can easily omit the return address when typing the macro, or you can prepare different versions of each macro corresponding to different return addresses.

Our macros are designed to work with each program as it comes out of the box, and with an unmodified LaserJet, LaserJet Plus, or LaserJet II. All the macros use the landscape Courier font that comes with all LaserJets, but you can modify the macros if you prefer a landscape font that you use in the form of a cartridge or soft font. The new LaserJet IID arrived too late for us to try out our macros on it, but any macro written for the LaserJet II should work equally well on the IID.

With minor variations, the macros find the address in your letter by searching for the date and then moving down a couple of lines. If you put the address more than three or four lines below the date, you can add keystrokes that will move the cursor



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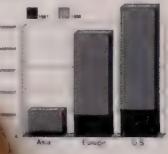
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down to the proper place. But you may not have to bother, because the macros will still work, although the address may print lower down on the envelope.

If you don't start your letters with the date, leave out the macro's opening keystrokes that tell it to go to the top of file and search for the date. If you let the macro begin at the point where it starts defining the block in which it stores the address, the macro will still work, but you'll have to move the cursor to the start of the address before running it.

The macros expect to find at least two carriage returns after the address. The one exception is *MultiMate*, which can't search for two carriage returns while defining a block. We've provided two macros for *MultiMate*: one will work with any three- or four-line address; the other prompts you to mark the end of the address and press a key to continue.

Our macros are designed to be used in files that contain a single letter, and they search forward for the date from the top of the file. To use a macro in files that contain series of letters, modify it to search backwards for the date, and invoke the macro immediately after completing each letter in the file.

Before creating any of these macros, type a letter in your word processor and make a dry run through all the keystrokes.



efore creating these macros,

type a letter and make a keystroke dry run.

If anything special about your setup causes problems, you can find and correct it before recording the macro.

When you run these macros, the Laser-Jet II will display the message "Feed Envelope" (or, with some programs, "Feed Letter") until you insert the envelope in the slot on top of the paper tray. If you insert the envelope before you start, the printer will print it without flashing anything. The original Laser-Jet and the Laser-

Jet Plus will flash "PE" (Put Envelope) or, with some programs, "PF" alternating with "L" (Put Form and Letter).

With all LaserJet models, insert the envelope face up, with the "stamp end" entering the printer first and the returnaddress end trailing behind.

DisplayWrite 4

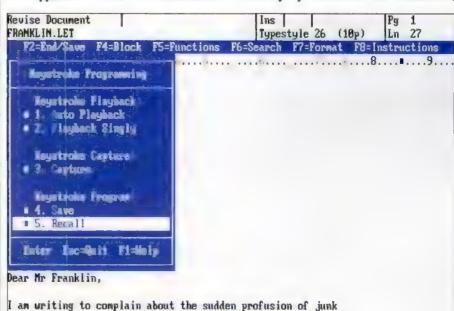
DisplayWrite 4, IBM's \$495 word processor, is slow, musclebound, and inconvenient, but it gets the job done reliably. Don't expect an old dog like DisplayWrite 4 to learn any of the fancy tricks that its high-end rivals can perform effortlessly. But DisplayWrite 4 knows one or two things the young dogs might learn if they sat still for a moment or two.

Until recently, DisplayWrite 4 officially supported any printer you liked—as long as it was made by IBM. Finally, without making much noise about it, IBM acknowledged that Hewlett-Packard had sold one or two laser printers, and DisplayWrite users can now obtain LaserJet printer drivers written by IBM. You'll have to ask your dealer for free copies of the DisplayWrite 4 "Printer Function Table Supplement" disk, which contains the



drivers, and the "Modification Update 02" disks, which update DisplayWrite 4 so that it can use the drivers. When your dealer says he's never heard of these disks and doesn't know how to get them, tell him you read about them in PC Magazine.

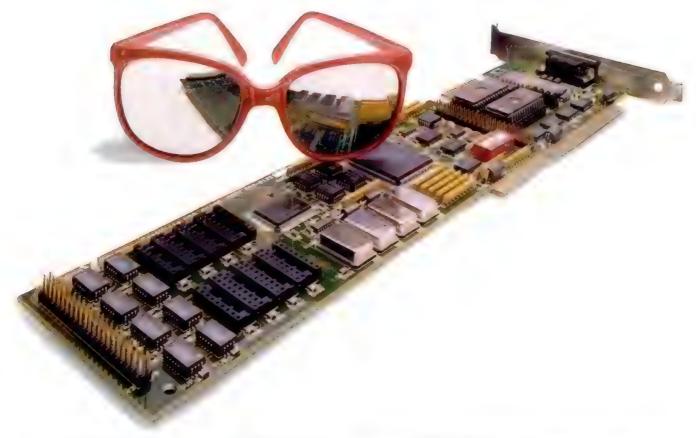
Our macro, shown in Figure 1, will find the address in a letter and automatically print out both the letter and an envelope. Because *DisplayWrite* is used almost exclusively by businesses and institutions,



mail that has begun to infest the American postal service. Do our couriers not have better and more urgent missions to

DisplayWrite 4's keystroke programming menu is called up by pressing Ctrl-F1. You can also map a macro to a function key.

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Search for page 999 (goes to end of file). F6 G 999<Enter> Insert required page break after last page. <Ctrl-R> 27 R A Reset Format to Alternate Format. F6 G 1 Go to top of first page. P6 P Find ... ,<Space>198 ", 198" to find date. <alt-8><Enter> Remove any leftover search string; search. <Home><Down><Down> Move down to start of address. Begin Block Copy. F4 C P6 F Find ... Two carriage returns at end of date. <Ctrl-L><Ctrl-L> <Alt-8><Enter> Remove earlier search string; search. (Enter> Define address in Block. F6 G 999<Enter> Go to last page again. Copy address to envelope. (Enter> F2 P Paginate, save, and exit. Print the letter and envelope. P<Enter><Enter>

Figure 1: As you type this macro for *DisplayWrite 4*, press the Enter key only where the listing includes "<Enter>" and the Spacebar where it says "<Space>". When more than one keystroke is listed on a line, press the keystrokes in order, without adding spaces between them.

we have not included instructions for a return address. It's possible to include the return address in the macro by including the necessary page layout changes, but this involves a large number of keystrokes.

FIRST THINGS FIRST The first thing to do, if you haven't done it already, is to modify your *DisplayWrite* profile to work

with these drivers. If you use DisplayWrite mainly for reports and correspondence, you should revise your default System Profile. Otherwise, create a special profile for correspondence, and activate it when needed.

When revising or creating a profile, first revise the Defaults for Text. Choose Alternate Format, then go to the Mar-

gin/Tab screen and set the margins to 55 and 108 for the LaserJet II (52 and 105 for the original LaserJet or LaserJet Plus).

Then, still under Alternate Format, go to the Page Layout screen and for the LaserJet II, set the first typing line at 26 and the last typing line at 36 (for the original LaserJet or LaserJet Plus, use 40 and 50). Set the header at any number higher than the first typing line and the footer at any number lower than the last typing line. Now press PgDn for the second page of Page Layout options, and set paper width to 11 inches and paper length to 8.5. As paper source, choose Envelope Feed.

Now choose Workstation defaults, select options for Printer 1 (or whichever printer number you use for the LaserJet), and choose Automatic Feed as the paper source. For your printer table, choose HPLASER2.PFT for the LaserJet II, or HPLASER.PFT for any others. Finally, save the profile and activate it.

LET'S MAKE A MACRO Begin by creating a letter. Make sure that you enter the date in the form "October 31, 1988" and then press Enter twice before entering the address. Type the text of your letter. When you are finished and ready to print, create our macro by pressing Ctl-Fi to turn on

GET READY FOR LASER-READY ENVELOPES

Envelopes especially designed for laser printers will reduce the incidence of paper jams.

The HP LaserJet can sometimes be a bit too helpful—notably when the heat of the printer seals an envelope so you have to pry it open before inserting a letter. The printer also has a bad habit of wrinkling envelopes, possibly to pay them back for causing paper jams.

You can reduce paper jams by rubbing your fingernail across the leading edge of an envelope before printing it. But you're better off using envelopes that resist jamming by themselves. The Stuart F. Cooper Co. (1565 E. 23rd St., Los Angeles, CA 90011-9989; (800) 421-8703, (800) 821-2920 in Calif.) manu-

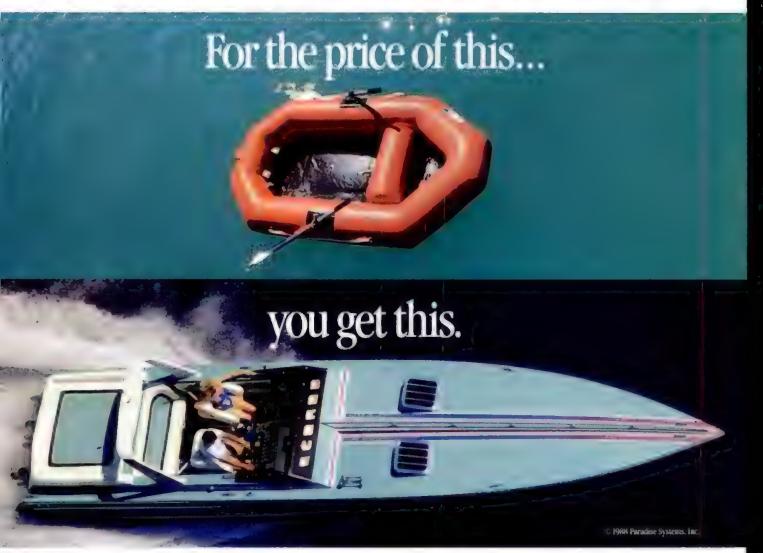
factures envelopes especially designed for trouble-free laser printing. Plain 20-pound envelopes cost \$32.75 for 500, \$61.00 for 1,000, and \$141.25 for 2,500. Plain 24-pound envelopes cost \$35.50 for 500, \$66.00 for 1,000, and \$152.50 for 2,500.

The fibers on these envelopes run parallel to the edges to help prevent wrinkling; those on standard envelopes run diagonally, and tend to pull to one side or the other in the printer. The Cooper envelopes also use self-seal flaps with a pulloff strip so you won't have to pry open your envelope after you've printed it. For an additional charge, Cooper will print or engrave its envelopes with inks that won't feather or melt from the heat.

Cooper doesn't claim that its envelopes will cure all your printing problems. In fact, Cooper sends a variety of papers for you to try out before you make a large purchase. The company has found that some laser printers actually do a better job with standard envelopes. The HP LaserJet printers we used in PC Labs jammed occasionally with standard envelopes, but Cooper's laser envelopes printed with no trouble at all.

-Edward Mendelson

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Keystroke Programming. Select Capture, and type in each of the keystrokes in the left-hand column of our listing. The comments in the right-hand column are for your information only; do not type them into your computer.

When you're through, press Ctrl-F1 to stop recording your keystrokes. Select End Capture, then Save. You can assign the macro to an Alt or Shift state of a function key (as in Alt-F1) by pressing that key when prompted for the name of the macro, or save the macro under a name like ENV.

While you are saving the macro, the full text of your letter is emerging from the printer. If you have a LaserJet II, the letter will print first, and then the printer will prompt you to insert the envelope. If you have an earlier LaserJet, *DisplayWrite 4* cleverly prints the pages in reverse order so that they fall into the paper tray in the correct order. That means that you'll be prompted for the envelope first, and then the printer will print the remaining pages.

When you're ready to print another letter, either press the function key to which you've assigned the macro or press Ctrl-F1, choose Recall, and enter the name of the macro. In either case, select Automatic Recall to run the macro and print the letter and envelope.

MODIFICATIONS To debug an existing macro, select Playback Singly instead of Automatic Recall. The next keystroke will be displayed at the top of the screen in sequence, and you have to press Enter to play it back. If you want to insert keystrokes into the macro, press Ctrl-F1 during this playback, choose Capture, type the keystrokes, then press Ctrl-F1 again and select End Capture. To delete a keystroke, press Del instead of Enter. Although DisplayWrite 4 doesn't provide the separate macro editor that other programs have, it lets you modify a macro while it's being performed, when it's easiest to figure out exactly what went wrong.

If you're still using DisplayWrite 3, IBM's LaserJet drivers won't work. But you can buy a full-featured set of DisplayWrite 3 drivers from DLB Software, which will let you print envelopes as easily as you can with DisplayWrite 4. You'll have to use slightly different keystrokes in an envelope macro (in DisplayWrite 3 the

Required Page End is on the F8 Instructions menu), but the basic principle is the same. DLB Software is located at 12808 Woodbend Court, Dallas, TX 75243; (214) 238-5945. The drivers range in price from \$75 to \$120, depending on LaserJet model.

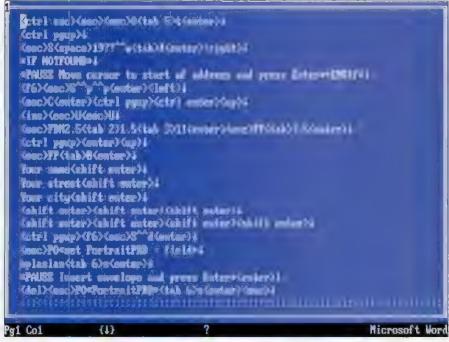
Microsoft Word

After letting *Word* stagger along for 4 years without keyboard macros, Microsoft added a full-featured macro language to Version 4.0 of its \$450 word processor. The wait was worthwhile. *Word*'s macros are easier to write and edit than anyone else's, and they offer foolproof and flexible ways to print envelopes on a LaserJet or anything else.

You can create a *Word* macro in either of two ways. The simplest is to turn on *Word*'s macro recorder by pressing Shift-F3. Then press the keys you want it to play back later. Press Shift-F3, and give the macro a name when prompted. If you want to assign the macro to a single key combination, type a caret (^) after the name of the macro, then press the Ctrl key and an alphanumeric key, such as M; the macro



will then play back whenever you press Ctrl-M. Or you can assign the macro to a pair of keys by typing the caret, then Ctrl followed by two letters. Because macros are stored in *Word's* glossary, you can play back a macro by typing its name into a file and pressing F3, just as you do to insert or-



Shown here is the full text of our Microsoft Word macro as it appears in Word's editing screen. You enter the guillemets (<<>>) using Ctrl-[and Ctrl-]. After typing in the macro, select the Whole Document command and copy the macro to the glossary.

<ctrl esc><esc> Force highlight into edit screen. <esc>O<tab 5>t<enter> Switch to text mode if in graphics (this is for speed, not function). Go to top of file. <ctrl pgup> <esc>S<space>19??^^w Search for space, date, white space. <tab>d<enter> Search forward and find date. <right> Move beyond date to start of address. «IF MOTFOUND» If search fails, user finds address. «PAUSE Move cursor to start of address and press Enter» «EMDIF» <£6> Extend the selection, <esc>8^^p^^p<enter><left> search for two paragraph markers, <eac>C<enter> and copy the address to the scrap. <ctrl pgup><ctrl enter> Top of file; open a new division. <up><ins> Go into new division; insert address. <esc>U Now delete address, then... undelete so it's highlighted again. <esc>FDM2.5"<tab 2>1.5"<tab 3>11"<enter> Format the division. (Original LJ: use 4.7, 1.4, 11.) <esc>FP<tab>3.5"<enter> Indent the highlighted address. <ctrl pgup> Go to top of file. <enter><up> Go above address. <esc>FP<tab>0<enter> Go to left margin for return address. Your name<shift enter> Replace any of these lines with your Your street<shift enter> address, or insert return address Your city<shift enter> before any ''<shift enter>''; don't <shift enter><shift enter> delete any ''<shift enter>''. <shift enter><shift enter> <shift enter><shift enter><shift enter> <ctrl pgup><f6> Go to top of file, extend selection. <esc>\$^^d<enter> Search for division boundary. (See text if using old LaserJet.) <esc>PO«set PortraitPRD = field» Go to print options, find the name of the standard driver, hplaslan and substitute a landscape driver (use any landscape driver's name). <tab 6>s<enter> Choose to print the selection only, «PAUSE Insert envelope and press Enter» Print it! Delete the envelope page. <esc>PO«PortraitPRD» Restore standard printer driver,

Figure 2: Type the text of this *Word* macro, including the angle brackets and the NAMES of the keys, exactly as shown above. Type "<enter>" just as you see it here, complete with angle

brackets. Enter the guillemets («, ») by pressing Ctrl-[and Ctrl-]. You may press the Enter key at the end of each line to make the macro easier to read and revise.

dinary text into a file from the glossary.

<tab 6>a<enter><esc>

The other way to create a macro is to type it as a document. But you create a special kind of document in which control keys, function keys, and cursor keys are represented by their names, printed between angle brackets like this: <esc>, <enter>, or <ctrl M>. When you're through, select the whole document by pressing Shift-F10, and copy the macro to the glossary. Give it a name the same way you name a macro when you record it.

EDITINGAMACRO To edit an existing macro, start with an empty window and press Esc, then I (for Insert). Enter the

name of the macro, followed by a caret. If you leave out the caret, *Word* will obediently play back the macro, with results that you may not like. When you're through editing, select the whole macro and copy it back to the glossary.

restore print option defaults.

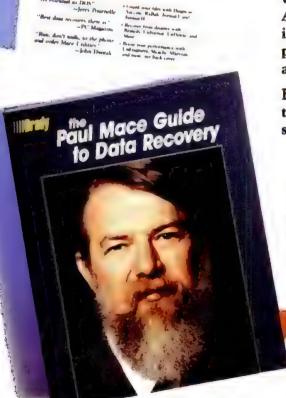
You can debug a misbehaving macro by pressing Ctrl-F3 to turn on a single-step processing mode. Now when you play back a macro, *Word* pauses at each keystroke and waits for you to press a key before continuing. When you find out what's going wrong, press Esc to stop playing back the macro, and then edit it.

You can create our envelope macro, shown in Figure 2, by typing it as a *Word*

document, selecting the entire text, and copying it to the glossary under any name you like. Enter all the text in the left-hand column; ignore everything in the right-hand column. While you can press Enter or Shift-Enter immediately after each line in the left column, do not add any spaces or tabs at the end of any of the lines. Enter the guillemets, « and » (or "chevrons," as Word calls them), by typing Ctrl-[and Ctrl-].

When you make a test run of these keystrokes, omit everything within guillemets except where the macro restores your original printer driver at the very end. For the dry run only, simply type in the name of





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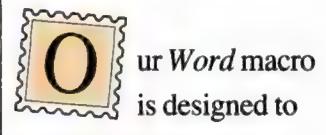
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All copies of Word 4.0 come with a landscape printer driver for the LaserJet or LaserJet II, called HPLASLAN.PRD, with other landscape drivers for individual font cartridges. Recent copies also have improved drivers for the LaserJet II, with names beginning with H2 instead of HP. Our macro uses HPLASLAN.PRD, but when you type the macro you can substitute the landscape driver that corresponds most closely to the LaserJet driver you use for normal printing. If you use landscape soft fonts, or a font cartridge that has landscape fonts, you can include in the macro a command to change to the correct landscape font. Add this command immediately after searching for the division boundary, when the entire envelope is highlighted.

CHOOSING THE RIGHT BIN Although Word's Printer Option screen lets you select Bins 1 through 3, you can't use Bin 3 to select the LaserJet's envelope feed, as you can with other programs. If you're using the original LaserJet or the



perform by itself all the work of formatting an envelope.

LaserJet Plus, you will have to hit the manual feed button before inserting the envelope. But you can save yourself the trouble by adding a line to the macro at the point where it says "see text below if using old LaserJet":

<esc>PD{ASCII27}&l3H<esc>

This line sends directly to the printer the codes that make it expect to receive paper in the manual feed slot. Where we print {ASCII 27}, simply hold down the Alt key and type 27 on the number pad. This will insert a left-pointing arrow in the text and

send the Escape character to the file. The character after the ampersand is a lower-case I, not the numeral 1. Make sure to capitalize the H. (You don't need to bother with this line for the LaserJet II.)

If you want the macro to print the letter itself after printing the envelope, simply add this line at the end:

<esc>p<enter>

Our macro is designed to perform by itself all the work of formatting an envelope. It should work properly in virtually any circumstances, without any change, but if you will be the only person using it, or if all copies of *Word* in your office use the same formats and style sheets, you may want to modify the macro so that it uses the glossary to import your return address and a style sheet to format the envelope instead of formatting the address and return address directly.

Both of these changes will make the macro run faster. If you keep your return address in the glossary under a name like RA, the macro doesn't have to type it in letter by letter. Instead of including your name and address in the macro, simply enter "RA<F3>" and Word will insert the address for you. Use <shift enter> after each line so that a style can format the return address as a single paragraph.

USING STYLE SHEETS Here's an outline of the procedure for using styles to format the envelope and recipient's address. (The measurements are for the LaserJet II; where the original LaserJet and LaserJet Plus need different measurements, these are given in parentheses.)

If you want Word to print a return address, create a division style that sets the top margin to 2.5 inches (4.7 inches), the left margin to 1.5 inches (1.4 inches), and the page width to 11 inches. Create a paragraph style for the return address, with enough "space after" so that the return address and the space after total 2 inches. Create a paragraph style for the receiver's address that indents it by 3.5 inches. You can include landscape printer fonts, if available.

One small warning: our macro won't work if the very first text in your document is formatted as hidden text. A word of

thanks is due to contributing editor M. David Stone, who pointed this out and made valuable improvements to our original version.

MultiMate Advantage II

It wasn't easy to write a full-featured envelope macro for *MultiMate Advantage II*. But we finally managed to work around the awkward design, limited functions, and hitherto undiscovered bugs of Ashton-Tate's \$565 word processor. Our macro looks as if it were programmed by Rube Goldberg, but it works. And now *Multi-Mate* users will be able to print out their letters and envelopes, and have those letters restored to their original condition in case they need to be revised later.

Ashton-Tate's tech support normally suggests that you print a LaserJet envelope as a separate document. But if you do that, you can't automate the process, because *MultiMate* won't let you transfer an address to a template file. You can copy *from* a letter file on-disk to an envelope file on-screen, but you will have to type



ow MultiMate
users will be able

to print out their letters and envelopes, and have those letters restored to their original condition in case they need to be revised.

in the name of the letter every time.

On request, Ashton-Tate will send you a LaserJet sheet-feeder driver that lets you specify that either the first or the last page of the file will print from the envelope tray. You also insert a font-change code (Alt-C, then a letter representing a landscape font) at the top of the page that includes the text for the envelope.

To format your envelope, you have to press the Enter key about 25 times, then

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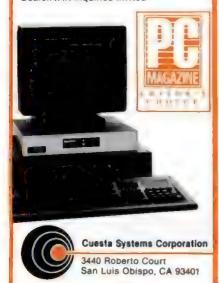
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■ ENVELOPE PRINTERS



ENVFIND is our macro that automatically finds the recipient's address when you are using MultiMate Advantage II. This is how it appears in the program's key-procedure editing utility. Once you bring the cursor into the text of the macro, you must press Ctrl-M to change modes; if you forget to switch from Delete Mode to Cursor Mode, you will probably destroy the macro.

press the Spacebar 50 times to set a new tab stop, and then press the Tab or Indent key for each line of the address. To add injury to insult, the printer always spews out a blank page before and after printing the envelope.



A TALE OF TWO MACROS We can do better than that. We've written two macros, shown in Figures 3 and 4, that automate envelope printing (without wasting paper) in slightly different ways. Choose the macro that suits you best.

ENVFIND (Figure 3) automatically finds the address and prints an envelope, but only if the address is exactly three or four lines long—as most addresses are. ENVPROMPT (Figure 4) finds the beginning of the address, but prompts you to point to the end of it. This works best if you frequently find yourself writing to people whose addresses have widely varying lengths.

All you need to do before you create and run one of our macros (or Key Procedures, as *MultiMate* calls them) is to copy the Printer Action Table for LaserJet envelopes from the Printer Driver floppy disk that comes with the package. You'll find LJETENV.PAT in the \PRINTERS directory on the disk. Copy it into your *Multi-Mate* directory and you're ready to type in the macro and use it.



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```
<F1><Home>
                                       Go to top of first page.
<T2>
                                       Insert page break.
                                       Search for date.
<F6>, <Space>198<F10>
<Alt-F3><Down><Down>
                                       Go to beginning of line and two lines down.
<TR>
                                       Start to define block for Copy.
Own>Own>Own>
                                       Include three more lines.
<Alt-F4>
                                       Include all of fourth line.
<F10>
                                       Finish defining block.
<Ctrl-PoUp)
                                       Go to previous page.
                                       Copy the block.
(#10)
<Alt-3>
                                       Print the document; set options first.
001
                                       Start at page 001.
                                       Stop print after page 001.
001
                                       Draft mode; no need for enhanced print.
001
                                       Print one copy.
                                       Left margin 55 (52 for original LJ, LJ+).
055
023
                                       Top margin 23 (37 for original LJ, LJ+).
                                       Do not double-space.
                                       Default pitch (4 = 10 cpi).
ljetenv<spacebar>
                                       Printer Action Table for envelopes; Spacebar fills the entire field.
CF10>
                                       Print the envelope.
                                       Insert a Stop-or-Continue prompt.
<Ctrl-F7>
1<F10><F10>
                                       Edit the same document again.
<Del><Ctrl-End><Del>
                                       Delete the first page.
<Shift-F2>
                                       Remove the page break.
<Alt-3>
                                       Print the document; set options first.
001
                                       Start at page 001.
999
                                       Stop at the last page.
                                       Draft mode OK.
                                       Print one copy.
001
010
                                       Left margin 10 (adjust to your defaults).
                                       Right margin 6 (adjust to your defaults).
006
                                       Do not double-space.
n
                                       Default pitch.
ljetfsl<spacebar>
                                       Standard LJ printer driver; use the driver you use normally.
<F10>
                                       Print the text.
<Ctrl-F7>
                                       Another Continue/Stop prompt.
```

Figure 3: ENVFIND, one of two macros for *MultiMate Advantage II*, automatically finds the address and prints an envelope, but only if the address is three or four lines long. Type in the keystrokes

listed in the first column only. Do not press Enter anywhere in the macro.

USING YOUR MACRO When you've finished writing a letter, press Ctrl-F8 to execute a key procedure. Type the name of the key procedure, press F10, and sit back and relax.

The macro goes first to the start of the letter and inserts a page break to create a new blank first page. It then searches for the date above the address by looking for the string ", 198". (This will work until December 31, 1989. With luck, you'll be using a different word processor by 1990.)

The ENVFIND version of the macro then moves down two lines and defines the next four lines as a block. If you have a three-line address, it defines the address and the blank line that follows; if you use a four-line address, it defines the complete address.

The ENVPROMPT version of the macro doesn't define the next four lines, but displays the prompt "Press (C) to continue. Please enter data, then Ctrl-F6 to resume." We didn't write that prompt, by the way; it's built into *MultiMate*. Press C, move the cursor to the end of the address, then press Ctrl-F6, and the macro will proceed.

Both versions of the macro now copy the address to the blank first page, call up the Document Print Options menu (in effect, by pressing Alt-3), and print the document on-screen. The macro sets the options so that only the first page prints; it sets the top and left margins to the correct size for an envelope, and selects the LJET-ENV printer driver. Then it starts printing.

At this point a prompt asks you whether you want to continue or stop. Wait until the envelope finishes printing—don't be impatient or else the macro won't work. Then press C to continue. The macro now calls the same document to the screen, deletest the envelope page, and calls up the Document Print Options screen again. This time, it sets the options for standard page printing; restores your standard printendriver, and prints the text of the letter.



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(LT>chome>	Go to top or first page.
<t2></t2>	Insert page break.
<f6>, <space>198<f10></f10></space></f6>	Search for date.
<alt-f3><down><down></down></down></alt-f3>	Go to beginning of line and two lines down.
<t8></t8>	Start to define block for Copy.
<ctrl-f6></ctrl-f6>	Insert prompt (MultiMate calls it ''Pause'').
⊄ 10>	Finish defining block.
<ctrl-pgup></ctrl-pgup>	Go to previous page.
<f10></f10>	Copy the block.
<alt-3></alt-3>	Print the document; next lines set options.
001	Start at page 001.
001	Stop print after page 001.
y	Draft print OK.
001	Print one copy.
055	Left margin 55 (52 for original LJ, LJ+).
023	Top margin 23 (37 for original LJ, LJ+).
n	Do not double-space.
4	Default pitch (4 = 10 cpi).
ljetenv <spacebar></spacebar>	Printer Action Table for envelopes.
<f10></f10>	Print the envelope.
<ctrl-f7></ctrl-f7>	Insert a Stop-or-Continue prompt.
1 <f10><f10></f10></f10>	Edit the same document again.
<pre>Oel><ctrl-end>Oel></ctrl-end></pre>	Delete the first page.
<shift-f2></shift-f2>	Remove the page break.
<alt-3></alt-3>	Print the document; set options first.
001	Start at page 001.
999	Stop at the last page.
Y	Draft mode OK.
001	Print one copy.
010	Left margin 10 (adjust to your defaults).
006	Right margin 6 (adjust to your defaults).
n	Do not double-space.
4	Default pitch.
ljetfsl <spacebar></spacebar>	Standard LJ printer driver; use your normal driver
<f10></f10>	Print the text.
<ctrl-#7></ctrl-#7>	Another Continue/Stop prompt.

Go to top of first page.

Figure 4: ENVPROMPT, also a MultiMate macro, finds the beginning of the address, but asks you to point to the end of it. Type in the keystrokes listed in the first column only. Do not press Enter anywhere in the macro.

At the very end of the macro, we've included another prompt that asks whether you want to continue or stop. This time you want to stop. The prompt is included only because if it isn't there, a nasty bug in MultiMate tends to cause loose keystrokes to be played back as the macro ends, so that MultiMate beeps, acts unpredictably, and generally fouls things up.

To record our macros, you should create a new document, type in a date and address, and then press Ctrl-F5 to build a key procedure. Type in the name of the macro and press F10. Then enter the keystrokes in the listing. When you finish, press Ctrl-F5 again. When you create the ENVFIND macro, the envelope will print out with the

address. If, however, you type in the keystrokes that create ENVPROMPT, the macro will print a single character on the envelope instead of an address—but when you play back the macro later, it will work correctly.

A MADDENING MACRO EDITOR If

you make a mistake while entering the macro, prepare for a frustrating session with MultiMate's macro editor. From the Utilities menu, choose the Key Procedure Files Utility, then choose Edit an Old File and select the macro you want to fix.

To move around the file, select Cursor Mode. When you reach the point where you want to make a change, press Ctrl-M

to choose Delete or Insert Mode, then press F10, and delete or insert keystrokes. Each mode only lets you delete or insert-you can't move around the file without pressing Ctrl-M again, choosing Cursor Mode, and then pressing F10. It's a lot easier if you get the macro right the first time.

WordPerfect

If you have a LaserJet and any version of WordPerfect earlier than 5.0, order the upgrade before 5 P.M. today. No other program makes laser printing as effortless and trouble-free as WordPerfect Corp.'s \$495 printshop—I mean word processor.

WordPerfect knows all about envelopes, and it knows exactly where to print an envelope on both the original LaserJet and the LaserJet II. This is one of the few macros discussed in this article that doesn't require different measurements for different printers.

WordPerfect 5.0 includes a powerful and complex programming language for its macros in addition to the easy-to-use recorded macros of earlier versions. To use the full macro language, you have to use the built-in macro editor, but the manual's description of the macro language will make sense only if you've had some programming experience. The MAC-



FILE ACT



WordPerfect, Version 5.0 WordPerfect Corp. 1555 N. Technology Orem, UT 84057 (801) 225-5000

Requires: 384K RAM (512K recommended), two floppy disk drives (hard disk recommended), DOS 2.0 or later. In Short: WordPerfect's recorded macros

are effortless to create, though the macro editor can be complicated to use. Envelope printing is effortless too, because the program comes with envelope formats built in. You can also view your envelope before printing with the impressive graphics-preview function. Not copy protected.

CIRCLE 682 ON READER SERVICE CARD



Our WordPerfect macro is shown here as it appears in the program's macro editor. WordPerfect automatically adds the "{Display Off}" instruction to a macro that you record at the keyboard, or you can add it from a menu of instructions that appears when you press Ctrl-PgUp.

RO.KBD file supplied with WordPerfect includes an all-purpose envelope macro that uses the programming language but doesn't produce perfect results with a LaserJet. Our LaserJet-specific macro, by contrast, can be recorded directly from the keyboard by anyone, and it produces perfect results. A more complex version of our macro, using the resources of the advanced macro language, may be found on PC MagNet.

BEFORE YOU BEGIN If you have the original LaserJet or LaserJet Plus, you should do one thing before using this macro. Go to the Print-Select-Edit-Forms menu, and with the highlight on "Envelope," go to the Edit menu and enter Yes next to "Initially present." Then exit by pressing F7 until you are back at the editing screen. This will prevent WordPerfect from beeping at you and making you go to the Print-Control screen to press G (for Go) whenever you want to print an envelope. If your copy of WordPerfect still beeps at you even after you make this change, or if it ever beeps when you are us-

ing a LaserJet II, you have a very early version of the program. Call WordPerfect Corp. for an updated copy.

You can record our macro, shown in Figure 5, by pressing Ctrl-F10 and giving the macro a name and description. If you name it something like CTRLE, you can invoke it later by pressing Ctrl-E. Or you can name it "ENV" and invoke it by pressing Alt-F10 and entering ENV. Or you can attach it to a key on a keyboard layout that you create using the Keyboard command on the Setup menu.

Record the macro by pressing the keystrokes listed in the left column in Figure 5. Only press Enter> where the macro specifically instructs you to do so. When you're done, press Ctrl-F10 to turn off macro recording.

If you make a mistake or two, you can use the built-in macro editor to correct them, and you won't need any programming experience. Press Ctrl-F10 and then enter the name of the macro that you want to edit. WordPerfect asks if you want to edit or replace it. Type E to bring up the editing screen; type A to enter that screen,

and then make your corrections carefully. Press Ctrl-F10 to toggle to a keystroke recording mode within the editor.

Because WordPerfect selects fonts intelligently, this macro will use the available landscape font that most closely resembles your default portrait font. You can also add an explicit font selection command to the macro.

RELIABLE DATE-SEARCHING The macro searches for the date by looking for a space, followed by "19", followed by any two characters and then two hard returns. WordPerfect's wildcard is a Ctrl-X, which you enter by typing first Ctrl-V, then Ctrl-X, when prompted for a "key." WordPerfect copies the address to a new page, prints the page, and then deletes it. On a fast machine you may not notice that anything has happened until your envelope slides out of the LaserJet.

If you want the macro to print the letter after printing the envelope, simply add these keystrokes at the end:

<Shift-F7>F

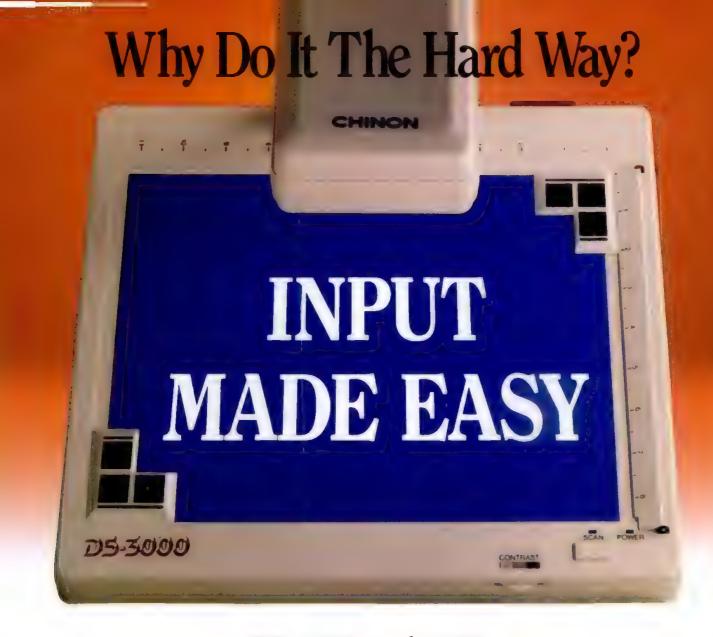
To make the date-searching part of this macro more reliable, we go to the top of the file and search forward. But if you're certain that the body text of your letters won't ever contain a date followed imme-



o print the letter after printing

the envelope, add a few keystrokes to the macro.

diately (with no punctuation) by two carriage returns, you can modify the macro to search backwards from the end. This way, you can write a series of letters in one file, print out the envelope for each letter when you're finished writing it, and then print all the letters at one time when you're finished with the file. Even with the present form of the macro, you can perform the same trick by adding each new letter at the start of the file.



DS-2000 and 3000: The Affordable Scanners From Chinon.



CIRCLE 318 ON READER SERVICE CARD

<Gome><Gome><Gome><Up>
<T2>
19</Ctrl-V><Ctrl-W><Ctrl-V><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><Ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><ctrl-W><c

<F2><Enter><Enter><F2>
<Ctrl-F4>BC

(F1)

<Eome><Eome><Up>

<Ctrl-Enter><Up><Shift-F8>PSEE

MO.25<Down>0<Down>P9<Enter>

1360.25<Down>0<Enter><F7>

Your name here<Enter>
You address<Enter>

Anyplace, USA<Enter>

<Enter><Enter><Enter><Enter>

<Enter><Enter>

<Shift-F8>LM4<Down>0<Enter><F7>

<Ctrl-F4>RB

<Shift-F7>P

<Ctrl-F4>ad

Go to top of file, before all codes.
Search for date (using wildcards).
Note initial space in this line.
Start the search.
Start defining the address.
Search for two [HRt] codes.
Copy the defined block.
Don't copy the block with <Enter>.
Back to the top of the file.
Start a new page, move into it.
Format Page Size Envelope.
Vertical margins; no page numbering.
Left and right margins; back to file.
Modify to suit your needs; but
don't delete any <Enter>.

Left margin for receiver's address.
Retrieve the block.
Print the envelope page.
Delete the envelope page.

Figure 5: As you record this macro for WordPerfect, Version 5.0, press the Enter key only where the listing has "<Enter>".

WordStar Professional

Dear Word-Processing-Advice Person,

A lot of programs suddenly seem to be advertised as "professional" word processors. Am I a pitiful amateur if I don't use one of them?

—Puzzled in Peoria

Dear Puzzled.

A "professional" word processor is one that is harder to use than the competition and accomplishes less. The vendor calls it "professional" in order to make its unfortunate customers feel better. They may have to remember obscure and illogical commands, but at least they can be proud of the difficulty of it all.

-The Word-Processing-Advice Person

WordStar Professional includes a macro feature called "Shorthand." Shorthand doesn't do much; it seems designed to make you wish it weren't there at all. You can't simply record your keystrokes. Instead you write them down, then enter them into a little window. Every time you want to enter a control code, you have to press Ctrl-P first, something you will inevitably forget. You can't debug macros by playing them back in single-step mode.

The Shorthand feature is all too appropriately named. Each macro is limited to about 50 characters. If you want to do something complicated like printing a letter, you'll have to chain macros. When you take WordStar Professional out of the box, you're limited to a total of 500 characters in all your macros, but you can expand this miserly amount through the WSCHANGE program.

Your hard-working programmer wasn't thwarted by all these obstacles, and if you're willing to type in some macros very carefully, you too can print envelopes automatically on your LaserJet. You don't even have to use WSCHANGE to get beyond the default 500 characters, although you may have to remove the sample macros that come with the program.

First, at the DOS prompt, enter the following command in every directory in which you expect to store letters:

<shift-F7>F

This will create a zero-length file called ENV.TMP that won't take up any space on disk. Our envelope macro, shown in Figure 6, writes a file called ENV.TMP to disk, and expects the answer Yes to a

prompt that asks if this file should be overwritten. If you already have this filename in the directory, the macro will work smoothly. You only have to do this step once.

If you haven't defined a sheet feeder for your LaserJet, go into WINSTALL and do



WORDSTAR PROFESSIONAL WordStar Professional, Release 5.0 MicroPro International

Corp. 33 San Pablo Ave. San Rafael, CA 94903 (800) 227-5609 (outside Calif.)

(415) 499-1200 List Price: \$495

Requires: 384K RAM (512K for Advanced Page Preview feature), two floppy disk drives, DOS 2.0 or later.

In Short: Clumsy formatting, printing, and macros make envelope addressing a complex task in Release 4. Bugs in Release 5 got in the way of our macros, but even if the program worked, its macros would still be awkward to write and use. Not copy protected.

CIRCLE 601 ON READER SERVICE CARD

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This WordStar Professional Shorthand screen is entirely devoted to the four linked macros that make up our envelope macro, but there's room for other macros as well. To enter a control character, press Ctrl-P first, then the character.

so now. You and I both know that you don't really have a sheet feeder, but the different slots on a LaserJet work the same way sheet feeders do, and the envelope slot is the equivalent of bin 3.

TAKE THE PLUNGE Now take a deep breath and go into *WordStar*. The following instructions apply to *WordStar Professional*, Release 4.0, and the LaserJet II; they are followed by a description of the

minor adjustments you'll have to make to work with the original LaserJet and Laser-Jet Plus, and the more difficult adjustments you'll have to make for Release 5.0.

Bring up the Shorthand menu by pressing Esc, then press? to edit or create new macro definitions. Begin by typing E, then name the macro "Env Macro 1" and type in the codes until the screen looks like the chart in Figure 6. Keep in mind that to type a control character like $\hat{}$ Q, you must first

```
E Env Macro 1

Toriof 180. INCNOME. CMIXIXARCOGEONON MOMORKA group

Env Macro 2

Los (1M. %) MusparMuspr or Community 180 Musp. 180 Moly;

G Env Macro 3

Y or Name MYC or Otteet (MY) or City, USA (MY) (n)

H Env Macro 4

IMOMORM M MOMUNIC (1M)

I Env Macro 5

TROTOGONOM MOMORK Or (KETEWEDO) on My) Fy (Kenebov) on my (10)
```

Figure 6: This is how the completed Shorthand screen for WordStar Professional, Release 4.0, should look. This macro works with the LaserJet Series II; two simple adjustments to Macro F will allow it to work with older LaserJet models. To enter a control character like Ctrl-Q, press Ctrl-P, then Ctrl-Q. To enter ^[, press Ctrl-P, then Esc.

type Ctrl-P, then Ctrl-Q. Similarly, the Esc character is entered by typing Ctrl-P, then Esc; it appears on-screen as \(^{1}\).

Macro E ends by running the second macro, F, which starts G, which runs H, which runs I. Each of these macros is entered the same way you entered Macro E.

The macro sequence starts by going to the top of the file and searching for the date in the form

"<space>19??<return><return>"

The question mark chosen at the Search Options menu makes the "??" in the search string function serve as wildcards.

The macro then marks the address as a block, goes to the top of the file, enters the format for a landscape page, types the return address, enters a new printer offset for the receiver's address, copies the address, and turns on the block once again. It zips back to the top of file, saves the marked block as a file named ENV.TMP, and deletes the block. ENV.TMP is then printed, and the cursor returns to the letter.

WordStar experts will notice in Macro F an apparently excess ".pa" command that looks as if it will print out an unwanted blank page. Don't omit that command. Unless Release 4.0 receives the sequence of dot commands ".bn 3", then ".op", then ".pa", the command to use bin 3 (the manual envelope feed) won't have any effect. The extra ".pa" doesn't eject a page, but simply makes the ".bn 3" command do what you might expect it to do anyway. Don't try to find this secret in the manual. Use your name and address in macro G or, if you want it to appear under a printed address, in macro H. Don't delete any 'M characters, which represent the Enter key, but insert your return address between the existing 'M characters.

For the original LaserJet or LaserJet Plus, use ".mt 27" instead of ".mt 13" in Macro F.

NEW COMPLICATIONS WordStar Professional, Release 5.0—at least the early copy that we received shortly before press time—is a lot trickier to work with. Although we followed the instructions of MicroPro's laser experts down to the last dot command, more than half of our attempts to print an envelope using the enve-

Princeton's UltraSync. The clear winner!



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PRINCETON'

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CIRCLE 209 ON READER SERVICE CARD

WORLD

August 22, 1988

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August 1988

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Resource

September 1988

66...very crisp display ...its colors are better than those on NEC's Multisync II. 99



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ENVELOPE PRINTERS

Env Macro 1 ^Qr^Qf 19??^N^N^M?^M^X^X^Kb^Qf^N^N^M^M^Kk^Qr^[f Env Macro 2 .pr or=L^M.mt 15^M.po 16^M.op^M^{g Env Macro 3 Your Name MYour Street MYour City, USA M [h Env Macro 4 ^M^M^M^M^M^M^M,po 50^M^[i Env Macro 5 ^Kc^Qf^M^M^Kk^Qr^Kb^KwEnv.tmp^My^Ky^KppEnv.tmp^K

Figure 7: This macro for WordStar Professional, Release 5.0, and the LaserJet Series II doesn't explicitly use the bin 3 command. If you put an envelope in the slot before running the macro, the LaserJet II will print the envelope even though the macro doesn't tell the printer to use the envelope feed.

lope feed caused WordStar to crash with a "Divide Overflow" message. Shortly before we went to press, we were told that MicroPro had a programmer working on the problem.

Meanwhile, by ignoring MicroPro's instructions and sample files, we devised a macro, shown in Figure 7, that lets the LaserJet II print an envelope—although it doesn't explicitly use the bin 3 command. If you put an envelope in the slot before running the macro, the LaserJet II will print the envelope even though the macro doesn't tell the printer to use the envelope feed.

The original LaserJet and LaserJet Plus need an explicit manual-feed command before they will accept envelopes, so this Release 5.0 macro won't work with those printers. MicroPro's recommended settings for the initial dot commands on an original-LaserJet envelope are as follows:

- .pr or=L .pl 51 .po 56
- .mt 41
- .mb Ø
- .op .bn3

Recipient's address Anywhere USA

.pa

If your copy of Release 5.0 consistently prints this file without crashing, you can incorporate similar settings into a macro like ours. To include the return address, first set the top margin to 31 and the printer offset to 10, then leave eight lines for the return address, and change the offset to 50 for the recipient's address. Maybe you'll get lucky. We didn't.

XyWrite III Plus

XyWrite III Plus is a raw and powerful engine that you can shape into a subtle and exact instrument. XyQuest's \$445 word processor includes an extremely powerful macro and programming language that can also be extremely obscure to anyone who doesn't have programming experience.

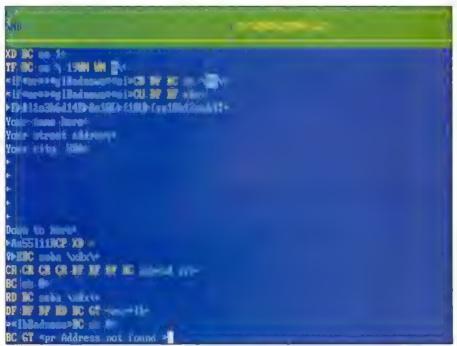
And XyWrite doesn't let you record a macro while you perform the actions you want to play back. But XyWrite does offer you a wide variety of ways to address envelopes.

On request, XyQuest will supply a small, effective XyWrite program that automatically prints out an envelope on a LaserJet II. The program requires some interaction between itself and your standard printer driver, and you have to insert a font code into the program before you first use it. You also have to keep a template file ondisk. Call XyQuest and ask for Application Note 114 and the accompanying disk.

LESS ELEGANT, MORE INSPIRED

Our macro is less elegant, but it finds the address for you, doesn't need a template file, and doesn't pay any attention to the printer driver you use. We've written it to use the Courier font that comes with the LaserJet, but you can modify the font identification codes to work with any portrait cartridge font or soft font.

The ingenious part of our macro, shown in Figure 8, is that it doesn't use XyWrite's printing functions at all. It simply writes out all the codes and text needed to print the envelope, defines them as a



Shown here is our XyWrite III Plus macro as it appears in the program's expanded mode. The twoletter bold codes are keyboard function codes, entered from the command line with "PFUN BC". The European quotation marks, or guillemets, are entered with Ctrl-< and Ctrl->.

■ ENVELOPE PRINTERS

```
(F3) Cancel any existing define.
XD
BC es 1<Enter>
                                         (BC = F5) Turn off error beep.
                                         (Ctrl-Home) Go to top of file. Next line searches for date and two CRs. (WN = Shift-Alt N)
BC se \ 19MM WDM <Ctrl-Enter>\<Enter>
                                         Make sure Scroll Lock is ON before pressing Ctrl-Enter!
                                         If not found, exit.
«if«er»»«glBadnews»«ei»
                                         (CD = down arrow) Cursor below date.
                                         (F1) Turn on define. Next line searches for two CRs.
DF
BC se \<Ctrl-Enter><Ctrl-Enter>\<Enter> Make sure Scroll Lock is ON before pressing Ctrl-Enter!
«if«er»»«glBadnews»«ei»
                                         If not found, exit.
                                         (CU = up arrow)
CU
                                         (F1) Block-define address.
DF
                                         (Ctrl-End) Go to end of file.
x&x<Enter>
                                         Insert marker to find later.
<Esc>E<Esc>&11o3h6d14E<Esc>&a18L
                                         Insert LaserJet format codes; for <esc> press Esc key. For original LJ and LJ+ use ''28E'' and ''15L''.
                                         Insert font ID code; original LJ and LJ+ use ''(8U'', not ''(10U''.
<Esc>(10U<Esc>(spl0hl2vsb3T<Enter>
                                         Modify return address here; you
Your name here<Enter>
Your street address<Enter>
                                           may remove any unneeded <Enter>s.
Your city, USA<Enter>
<Enter><Enter><Enter>
<Enter><Enter><Enter>
                                         Original LJ and LJ+ use ''521'', not ''551''.
<Esc>&a55111R
CP XD
                                         (F7) Copy address. (F3) Clear define.
                                         Send formfeed (use Shift-Alt 12 for ASCII 12).
<Enter><ASCII 12>
                                         Reset printer.
<Esc>E
BC seba \x &x \< Enter>
                                         Go back to the marker.
CR CR CR CR
                                         (CR = Right arrow) Go into envelope.
                                         (F1) (Ctrl-End) (F1) defines envelope.
DF BF DF
                                         Copy the defined block to printer.
BC append prn<Enter>
                                         Turn error beep back on.
BC es 0<Enter>
                                         (Alt-F6) Delete defined block.
BC seba \x&x\<Enter>
                                         Find marker.
DF BF DF
                                         (F1) (Ctrl-End) (F1) Define marker.
                                         (Alt-F6) Delete marker.
RD
BC CC «ex»
                                         (F5) (F10) End macro, clear command line.
                                         If address not found, say so.
«lbBadnews»BC es 0<Enter>
BC CC «pr Address not found »
```

Figure 8: This macro for XyWrite III Plus doesn't use the word processor's printing functions at all. Instead, it simply writes out all the codes and text needed to print the envelope, defines them as a block, and appends that block to a file called "PRN." Type this listing in expanded mode. The boldface two-letter sequences (always followed by a space) represent keyboard functions. They

are entered by going to the command line and entering PFUN XX (some copies of XyWrite also use PFUNC XX), or by pressing ScrollLock to turn on the recording function. Press the Enter key only where the listing has <Enter>; press Ctrl-Enter and the Esc key where the listing has "<Ctrl-Enter>" and "<Esc>". Enter the guillemets («, ») by pressing Ctrl-< and Ctrl->.

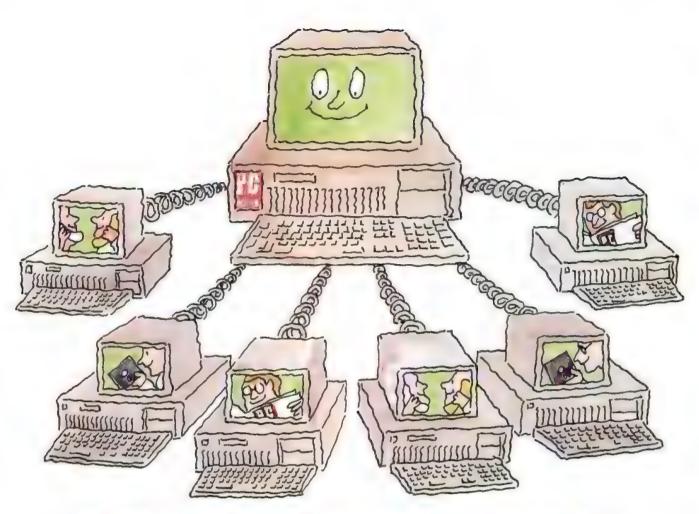
block, and then appends that block to a file called "PRN." PRN is DOS's name for your printer (you can use COM1 instead if your printer is attached to the serial port), and XyWrite treats it like a file. XyWrite thinks it is adding the text of the envelope to a file on-disk—but the result is a perfectly printed envelope on paper. Some versions of XyWrite III Plus will beep and display the message "Error writing to disk," but the macro will work exactly as it should.

The macro given here has one safety feature: it won't print the envelope if it

can't find the address. A more advanced version of this macro, with more-elaborate error checking, is posted on PC MagNet.

GETTING STARTED The first step in creating a XyWrite macro is to open a program file with the NEP command. If you want to call the macro ENVELOPE, enter NEP ENVELOPE on XyWrite's command line. Our macro uses the guillemets («, ») in which XyWrite keeps its programming and formatting codes, and which are invisible in the normal display mode. Press Ctrl-F9 to switch to expanded mode.

A XyWrite macro consists of function codes and ordinary text. Function codes represent the actions performed by individual keys. A XyWrite program represents the F5 key with a boldfaced "BC" followed by a space; this stands for Blank Command line. Unlike the situation when recording macros in Word and WordPerfect, you can only record these keystrokes "blindly" by inserting the codes into a separate program file; you can't immediately see what the effect of the keystroke would be if you entered it while working on a normal document.



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(Note: After you have become a member, you can locate a local telephone access number, or 2400 bps service, by typing GO PHONES at the ! prompt.)

2. When you receive a Connect or Carrier

- Detected message, enter Ctrl-C.
 3. At the HOST NAME prompt, enter CIS.
 4. At the USER ID prompt, enter 177000,
- 5000.

 5. At the PASSWORD prompt, enter PC*MAGNET and press Enter.
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■ ENVELOPE PRINTERS

You cannot enter a *XyWrite* function code by directly typing the letters **BC** in boldface in the text. Instead, you use one of two methods. First, you can record the keystroke by pressing ScrollLock to turn on the recording mode (an S appears at the top of the screen) and pressing F5; the **BC** code then appears in the text. If you make a mistake, turn off ScrollLock before trying to correct it; otherwise you'll only record the keystrokes that you try to use to correct the error, but the error itself will remain.

Alternatively, you can enter the BC code into the program by going to the command line and entering PFUN BC (do not turn ScrollLock on when doing this). This results in fewer errors, but both methods should yield the same outcome.

You want your completed macro to look something like the left column of our listing, although your screen will have line breaks only where the listing has <enter>. The boldfaced codes represent keyboard function codes, the guillemets contain programming commands, and everything else is text that you can type in as you normally do. Where the listing says <enter>, press Enter, and you should see a left-pointing arrow; instead of <ctrl enter>, you should see a reverse-video ring: instead of <Esc>, a right-pointing triangle; and instead of <ASCII 12>, the female symbol. To create the guillemets type Ctrl-< and Ctrl->.

When you're finished, store the program. After writing a letter, you can print the envelope by going to the command line



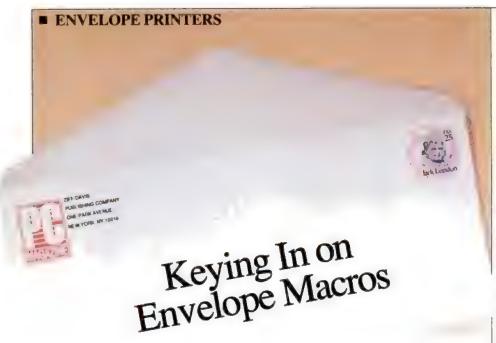
and entering RUN ENVELOPE.

If you want to attach the macro to a key like Alt-E, so that you can run it with one combination keystroke, add this line to STARTUP.INT:

BC ldpm envelope, e<enter>

The XyWrite manual has further suggestions for attaching a macro to any other key.







Here for the typing are

programs that make your

work for you. What could

two keyboard macro

printer do more of the

be smarter than that?

he classic memory-resident keyboard macro programs-programs like RoseSoft's ProKey and Borland's SuperKey-can do tricks like automating key-

strokes and cutting and pasting text from the screen. A newer generation performs its magic on the printer as well.

We've written envelope macros for two of today's most advanced keyboard macro programs, Keyworks and Lotus Metro. Each macro uses a variation on the same technique. Both prompt you to block off an address that appears on the screen, and then they automatically insert the address within formatting codes and send the

Most of the dedicated envelope-addressing programs reviewed in this issue can also capture an address from the screen and print it on an envelope. But a keyboard macro program lets you do a few hundred other things in addition.

Keyworks

About the only thing a Keyworks macro can't do is flip the big red switch that turns your computer on. We've found exactly one keyboard macro program that has more functions than Alpha Software Corp.'s \$99 package-and that's Alpha Software's \$299 Keyworks Advanced Version. The advanced version is designed for users with a little programming experience and a lot of time, but the basic Keyworks program is designed for anyone who can bang on a keyboard. Any macro written for the basic Keyworks will also work with the advanced version.

You run our envelope-printing Keyworks macro with your letter onscreen. The macro prompts you to mark the corners of the address on your letter, copies the address from the screen, and prints it on an envelope. You create the macro itself by loading Keyworks into memory, pressing the menu key (the default is gray Plus), choosing Edit Macros, and then typing our listing into the editing window exactly as it appears, except of course for the substitution of your own return address anywhere in the space provided. You can press Enter where the lines break in the listing. Immediately before the first "{Printer1}" code, you can add the keystrokes that will make your word processor return to the top of the document, if you like, so that the address will appear on-screen. In WordStar, for example, you could include "{CtlO}R".

We've provided two different listings; choose the right one for the LaserJet model that you use. The macro for the LaserJet Series II is shown in Figure 9; that for the original LaserJet and LaserJet Plus is shown in Figure 10. We've attached the macro to Ctrl-E, but you can choose any key you like. You can also invoke the mac-

whole thing to the printer. Our Keyworks macro stores the formatting code and return address in memory, and our Metro macro stores them on-disk. The result is the same.

ACT FILE Keyworks, Version 3.0

Alpha Software Corp. One North Ave. Burlington, MA 01803 (617) 229-2924 List Price: \$99

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In Short: One of the most advanced and function-rich keyboard macro programs available, with flexible and effective printer support. Not copy protected. CIRCLE 694 ON READER SERVICE

```
((CtIE) (Laserlet II Envelope Nacro) (Printer1)+
{z7}E{z?}&11a3h6d14E{z7}Ha1HL{z7}Hk1G{z7}{(10U{z7}{(ab10h12wab3}{<
four name here(Enter)+
Your address here (Enter)>
City, State USA(Enter)+
(Ester)+
(Enter)+
(Enter)+
(Enter).
(Enter).
(Enter).
(27)#a55111E(Printer1)+
(CutPaste)(100)(Printer1)(Expand)(100,12,27)E(Printer1)
((CtlP)(Original LeserJet Envelope Macro)(Printer1)+
127)E(27)A11o3h6428E(27)4a15L(27)Ak16(27)(EU(27)(sy10h12osh3T+
Your name here (Enter).
Your address here(Enter).
City, State USatEnter).
                Mat Mapy Planers Piul Meplace Mapani Physics
```

Keyworks macros can be created or edited in the program's built-in editor, which includes basic word processing functions. Everything between the "{Printer1}" codes is sent to the LaserJet.

ro from Keyworks' List Macros menu. Expert users can create a menu that will list this and other macros without attaching each macro to a separate key.

HOW TO BEGIN Start this macro with the text of your letter on-screen. The macro begins by sending the printer the codes

that format the envelope and the text with your return address. A message then asks you to block off the text to be pasted into the macro. You move the cursor to one corner of the block, hit B, move the cursor to the opposite corner, and hit Enter.

Keyworks copies the blocked text as an internal "numeric macro" that isn't nor-

```
{{CtlE} < LaserJet II Envelope Macro>(Printer1)
t2/tE(2"t&ll)3heil4E(2"t&al&Lt/'t&klGt."t(1 "t."'(spi0hl2vsb3T
Your name here:Enter:
Your address here:Enter:
City, State USA:Enter:
tEnter)
{Enter}
{Enter}
(Enter)
(Enter)
(Enter)
(Enter)
(Enter)
(Enter)
(Enter)
(Cuty, State USA:Enter:
t2't&ab5111P(Printer)
(CutPaste) [100] (Printer1) (Expand) (100,12,27)E(Printer1)
```

Figure 9: Create this file for the LaserJet Series II in the *Keyworks* macro editor. Type the curly braces exactly as they appear; press Enter at the end of each line. You do not need to include all the {Enter}s that appear on their own lines, only those you need to position your return address correctly.

GETTING PERSONAL

After making some minor modifications, you can use our macros with envelopes designed for personal correspondence.

ll of our macros and template files Aare designed for standard business envelopes measuring 91/2 by 41/8 inches. If you want to create macros for the 6½- by 35/8-inch envelopes used for personal correspondence, you should change some of the LaserJet control codes. With a LaserJet II, for the return address, replace the "18L" left margin setting with "46L"; for the left margin and row number for the recipient's address, replace "55111R" with "65110R". With the original LaserJet or LaserJet Plus, leave the returnaddress setting unchanged and for the recipient's address use "62L10R".

With word-processor macros that set margins in inches, you'll have to experiment to find the best results. For the left margin of the return address, try adding about 3 inches to the setting for a business envelope, and for the recipient's address add 2 inches.

---Edward Mendelson

mally run from the keyboard (we've given it the arbitrary number of 100, but you can use anything from 10 up to 255). It then "expands," or plays back, this numeric macro to the printer, and finally sends the codes to finish and print the envelope.

When Keyworks copies text from the screen, it normally inserts a carriage return character (ASCII 13) at the end of each line, instead of the usual carriage-return line-feed pair (ASCII 13, ASCII 10). When working with Keyworks interactively, you can tell it to put the CRLF pair at

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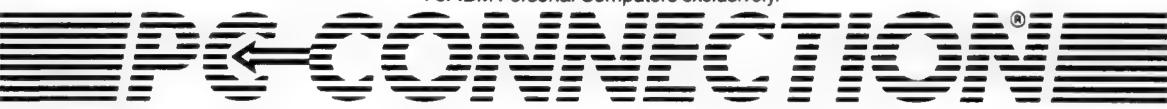
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Grandview 1.0	PC Connection	1.19th Hole Special (3 Golf programs above bundled with Mr. Boston Micro Bartender's
Breakthrough Timeline 3.0 349	Hardware Special	Guide)
R Spreadsheet Analyst 2.5 89	through December 31, 1988	CMr. Boston Official Micro Bartender's Guide. 18
R Note-It Plus 1.02	Kraft Systems 1 year	□ Micro Video Companion
• Think Tank 2 4NP	Premium 3-Button Joystick	Take Control of Cholesterol
R4 Views 1 0	Plus Microsoft NCP	Microprose CP
 Q&A Network Pak 1.0 (requires Q&A) 179 		L.F-19 Stealth Fighter (requires CGA or EGA) . 39
T/Maker NCP	Flight Simulator 3.0	□F-15 Strike Eagle (requires CGA) 22
RScrapbook+	For anyone who has ever imagined flying.	L.Gunship (requires CGA or EGA) 32
IR ClickArt Business Images 42.	our bundle of Microsoft's Flight Simulator	Microsoft NCP
R ClickArt Christian Images	3.0 and Kraft's Premium 3-Button Joystick	13 Flight Simulator 3.0 (regs. graphics brd.) 35
R ClickArt Holidays	is just the ticket to get you into the wild blue	Parlor Software CP
	yonder ¹	Bridge Parlor (best Bridge simulation) 49
The XTREE Co NCP	Kraft Premium 3-Button Joystick with	Sierra On-Line CP
• XTREE Pro 1.0	self-centering or float-free operation; has	(All require CGA or EGA)
Hot 4 0 95	an extra fire button on the top of the stick	€ Leisure Suit Larry
TOPS NCP	for ease of use	
Flashcard (AppleTalk network card.	Microsoft's Flight Simulator 3.0, now	
1 year warranty)		i∙.Manhunter
NetPrint 2 0 (share printers)	not copy-protected, offers 640 x 350	i Police Quest
TOPS 2.0	resolution graphics on EGA or VGA	Police Quest II
TOPS Repeater (extends network) 132	screens, as well as a fully instrumented	• Leisure Suit Larry II
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Battery Watch 1.0 (31/2" only) 27	Gates Lear jet—you decide	■3D Helicopter. 33
	Microsoft's Flight Symulator 2.0	
• Laplink Mac 1.2 (Mac-PC transfer) 79	Microsoft's Flight Simulator 3.0 reg. \$35	Simon & Schuster
• Laplink Plus 2.1	Kraft's Premium 3-Button Joystick. reg 33	• Star Trek: Rebel Universe
• Desklink 2.21	Buy both for just 59	Sphere, Inc NCP
True BASIC, Inc NCP		BOrbiter (shuttle simulation)
True BASIC 2.03 (now includes Runtime) 57		AGATO (submarine simulation)
R Algebra (includes both I & II)	R Testdrive (driving simulation) 24	• Tetris (addicting mind teaser) 24
R Kemeny/Kurtz Math Series special	IR Jack Nicklaus' 18 Greatest Holes 29	⊕Falcon (F-16 simulation, regs. graphics brd.) 32
A True Basic Libraries	R Grand Prix	Spinnaker NCP
Vericomp NCP	R4th & Inches	
• SoftBytes 2.0	Broderbund CP	□Kids on Keys (ages 3 to 9)
	1. Where in the World is Carmen SanDiego? 25.	Fiscemaker Gold (ages 3 to 8)
WordPerfect Corp NCP	Where in the USA is Carmen SanDiego? 25.	
WordPerfect Library 2 0 69.	Where in Furgners Cormon SanDiagn? 29	CSAT Propagation Program
WordPerfect 5.0	Tou Chan	EKidumter Cold (coop 5 to 10)
- Word Davident Office 4.0		Taniowhiter Gold (ages 6 to 10)
WordPerfect Office 1 0	1.Utilma IV	Homework Helper—Math (grades 7-12) 32
WordPerfect Network Server 5.0	:.Ultima v	Homework Helper—Writing (grades 7-12) 32
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WordPerfect Executive	Cone-on-One/Bird vs Jordan 29.	Algebra Plus (ages 13 to adult)
R WordPerfect 5.0 Addit'l Network Stations 84	.Chuck Yeager's Flight Simulator 32.	
Wordtech NCP	•.Chessmaster 2000	• My Letters, Numbers, Words (2 to 6) specia
DBXL 1.2	Earl Weaver Baseball	Second Math (ages 7 to 16) special
Xerox NCP	• Empire	Sublogic NCP
R Ventura Publisher 2.0 549	Mayıs Beacon Teaches Typing	Lulet 2.1 (requires EGA or CGA). 33
XyQuest NCP	Sentinel Worlds	
	• Grand Slam Bridge	
Ay THILE III I IUS S O WITHIA DAILE MICHUS 235	Infocom NCP	I Japan Sopran Diek
RECREATIONAL/EDUCATIONAL	Infocom NCP • Zork Trilogy	The Learning Company CD
HECHEAI IONAL/EDUCATIONAL	Life of the Burble of Course C	The Learning Company CP
	Lifestyle Publishing Group NCP	Math Rabbit (ages 4 to 7)
Accolade CP (reqs. graphics brd)	•.Golf Doctor (improve your game)	
R Bubble Ghost		ElWriter Rabbit (ages 6 to 12)
R Mean 18 29	• Golf Statkeeper (includes USGA	XOR NCP
R Hardball (baseball simulation)	Handicapper)	NFL Challenge 2.0 69



Bells on our phones ring,

Making spirits bright, What fun it is to ship these things That keep your PCs right...Oh!

HARDWARE

Manufacturer's standard limited warranty period for items shown is listed after each company name. Some products in their line may have different warranty periods

Alloy 1 year	
Tape System/2 (for PS/2 MicroChannel) \$2	299
Retriever/40 (for IBM AT & compatibles)	349
AST Research 2 years	
I/O Mini 2 C/S/P	89
SixPakPlus 64k C/S/P (upgrades to 576k)	129
Advantage Premium 512k S/P	
(upgrades to 1 Meg or 2 Meg	
w/Piggyback)	ca
Advantage 2 512k (for PS/2 Models 50/60).	
Advantage 2-386 (for PS/2 Model 80)	ça
RAMpage Plus 286 512k (for XT286/AT)	ca
RAMpage! Plus MicroChannel 512k	
(for PS/2 Models 50/60)	ca
Amdek 90 days	
LaserDrive-1 (external CD-ROM Drive) 6	329
LaserDrive-2 (internal CD-ROM Drive) 6	329
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2-Position switch box	29
3-Position switch box	39
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31/2" Disk Holder DB-2 (holds up 40 disks)	
31/2" Diskette Cleaning Kit CK-2	
Printer Stand PS-1	
Universal System Stand SS-3	
Static Mat SM-2	
Toolkit TK-1	25
DS-1 Switch Box (controls 2 printers)	33
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Printer-to-IBM cable EC-6 (9 feet)	
PS/2 Keyboard Extension Cable EC-9	
Keyboard Extension Cable EC-2	25
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Safestrip SP-3 (6 outlets; 1 year warranty)	
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Diamond SP-1 (6 outlets)	
Emerald SP-2	
	41
Sapphire SPF-1	45
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Cord)	55
Ruby-Plus SPF-2 Plus (w/FAX & modem	69
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PC Connection Hardware Special

through December 31, 1988

Practical Peripherals ... 5 years 2400 Baud Internal & External Modems

The Practical Peripherals 2400 SA has been a best-seller with us for some time now. The reason? It delivers high quality data transmission, Hayes compatibility, and made-in-the-USA quality. All at a terrific price

- Hayes asynchronous compatible
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We are an authorized Epson Service Center
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LQ-850 printer (80 col., 264 cps, 24 pin) call
LQ-1050 printer (136 col., 264 cps, 24 pin) call
LQ-2550 printer (136 col., 400 cps, 24 pin) call
LX-800 printer (80 col., 180 cps, 9 pin) call
Printer-to-IBM cable (6 feet)
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Logical Connection 256k
Logical Connection 512k 539
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Smartmodem 1200 299
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Graphics Card Plus	. 189
Network Card Plus (with TOPS DOS)	. 339
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Models 50/60/80)	269
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Inboard 386/AT Øk (req. installation kit)	899
Inboard Installation Kit (specify computer)	139
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Above Board PS/286 512k S/P	419
Above Board Plus 512k	429
Above Board 2 Plus 512k	479
Above Board Plus I/O 512k	529
Connection Coprocessor (FAX board	
olus)	769
Optional 2400 Baud Modern for Connection	
Coprocessor	229
MATH COPROCESSORS	

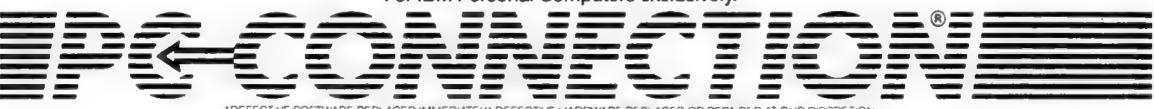
80287 (for AT & XT286)	16
80287-8 (for 8 MHz 80286 machines)	23
80287-10 (for PS/2 Models 50 & 60)	27
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eries 2 Mouse (for PS/2 50/60/70/80)	. 65
REZ Mouse (bus only)	89
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louse w/LogiCAD (bus or serial)	119
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Mach 20	349
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Mouse with Windows/286 (bus or serial)	145

Migent ... 1 year
Pocket Modern (1200 baud, incl software)



Jingle bells, give us a yell,

PC Connection knows the way. We hope you have a great New Year and happy holidays.

MSC Technologies lifetime OmniMouse w/Designer Pop-up menus	DRIVES	51/4" DS/High Density Disks for AT (1.2 Meg Fuji MD2HD (10 disks per box) \$22
(serial only; 1 year warranty) \$57	IOMEGA 1 year	Sony (10 disks per box)
PC Mouse If w/PC Paint + (bus or serial) 89	Dual 20 Meg Bernoulli Box (8") \$1679	Maxell MD2-HD (10 disks per box)
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Multisync Plus (960 x 720 max. resolution). 949	Bernoulli II Single 20 Meg Internal (51/4") . 767	Sony (10 disks per box)
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1200 Baud External Modem (mini) 79.	drive for the IBM PC (not for AT). Specify Beta	Your card is not charged until we ship
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Safe 425W (standby power backup) 369.	(28 ms)	120 day limited warranty on all products *
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P351SX Printer (132 col., 360 cps) 999.	(28 ms)	or Saturday 9 00 to 5:30. You can call our business
T1000 Laptop (80C88, 6.4 lbs., 5 hr. battery) call	PC, XT 360k Drive (5 ¹ / ₄ " half-height) 89.	offices at 603/446-3383 Monday through Friday 9 00
T1200 Laptop (80C86, 10 MHz, 20 Meg) call	720k Drive (31/2" half-height, specify XT	to 5 30
T1200HB Laptop w/Backlit screen call	or AT)95	SHIPPING
T1200F Laptop Dual Floppy System call	1.44 Meg Drive for AT (31/2" half-height,	
T1200FB Laptop Dual Floppy System w/Backlit	includes Bastech software utilities) 125	Note: Accounts on net terms pay actual shipping Continental US:
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T3100/20 Laptop (80286, 8 MHz, 20 Meg). call	AT 360k Drive (51/4" half-height) 89	and hard drives, pay actual charges. Call for UPS
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T5100 (80386, 16 MHz, 40 Meg) call	Buosso	 For all other items, add \$3 per order to cover UPS Shipping For such items, we automatically use UPS
External 51/4" Drive for Laptops 369.	DISKS	2nd Day-Air at no extra charge if you are more than 2
768k RAM Card for T1000	A46 . b . b . b	days from us by UPS ground
1 Meg EMS Card for T1100 + /T1200 499.	All disks have a lifetime warranty	Microsoftic
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VRAM VGA	Maxell MD2-D (10 disks per box)	Call 603/446-3383 for information
VII NIVI VOM	verbatiin bataile (10 disks per bux) 13.	



PC Presents.

You better not pout!
('Cause Santa Dos is coming to town.)

ere in the yuletide town of Marlow, NH (pop. 556), most of our neighbors have rather traditional ideas of holiday gift giving. For software, a nice new pair of red thermal underwear would be a real hearth warmer. Hardware? Well, a chainsaw might be really sharp. And, as for utilities, a telephone and running water would be welcome additions to some homes. Nevertheless, being hip to the trendy tastes of the microcomputer age, our very presentable mascots are making sure that we're well-stocked with PC games and gadgets for the byte-bitten on your Christmas or Hanukkah list.

It's a wrap!

People often ask us why we go to such lengths to satisfy customers. Well, our Customer Service Director thinks it's good business. Our Advertising Director thinks it makes good copy. Our mothers think it's their influence. But, actually, we give such nice (as opposed to naughty) service because of that famous list that Santa and his raccoons are making (and checking twice, we hear). But, frankly, we're a little worried about companies who don't give toll-free support, or who charge your credit card before they ship, or who don't ship backorders free, or who have developed any of those other naughty mail order habits. It's lump o' coal city for those dudes.

You're gonna get what's coming.

At our modest headquarters in the former Christmas Trees Inn in Marlow, we're frantically doing our last minute holiday shopping. If you want to be on our list, just place an

order of \$500 or more by January 31st, and you will get your very own surprise present from PC Connection! Specially programmed to self-destruct if opened before Christmas.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit please call ahead.



A surprise present which will no doubt feature our most gifted mascot. Offer not available to net accounts. One per customer.

For IBM Personal Computers exclusively.

IPG-CONNECTION

ENVELOPE PRINTERS

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(iCtlE:*Original | imer Ter Envel.pe Macro**Printerl*
(27)E:27;&llo3h6d. ME(27+&al5Ltz7+&klit27+(MUc27)*(cpl0hl2vst CT
Your name here:Enver)
Your address here(Enter)
City, State USA:Enver)
(Enter)
(CutPaster:|To::Expand::Lo5,lz,27:E(Printerl*)
```

Figure 10: To create this Keyworks macro for the original LaserJet or the LaserJet Plus, tollow the same instructions that were provided with Figure 9.

the end of each line, but in a hands-off macro that copies text to the printer, you need a different technique. The LaserJet commands in this macro include one unique command: "<esc>k1G". This tells the LaserJet to translate the carriage-return character into a CRLF pair, printing the cut-and-pasted text on separate lines.

Although it's beyond the scope of this article, Keyworks Advanced Version lets you write a macro that automatically finds the address. If you use Keyworks Advanced Version with a word processor or a database program that always displays an



can write a macro that finds the address.

address in exactly the same place onscreen, create a macro that goes to a specified line and cursor position and starts importing lines until it encounters a line that begins with blank spaces. If the address will appear at different places on-screen depending on the kind of letter you're writing, then you have to use more complicated tests and branchings, and you may be better off letting your word processor print the envelope directly.

Lotus Metro

What Lotus Metro takes away from your system by hogging acres of precious RAM, it gives back in functionality and flexibility. Lotus didn't design its \$85 set of desktop utilities as a LaserJet envelope-printing program, but that shouldn't stop you from using it as one.

You can assign our Metro macro, MAIN.KSM (shown in Figure 11), to any key—Alt-E, for example. Press Alt-E while you have a letter on your screen, and the macro will perform the following commands. (We've capitalized the words that correspond to menu items on *Metro*'s accessories, and you can compare these letters with those in the listing.)

The macro first calls up *Metro*'s Clipboard and Erases anything it might contain. It then tells the Clipboard to prepare to Copy Text. At this point the Clipboard disappears and a prompt appears at the top of the screen; it tells you to move the cursor to the start of the recipient's address and press F7 to start defining a block, then move the cursor to the opposite corner and press End and Enter.

The macro now pauses for you to enter your keystrokes; this pause is represented by "{LineIn}" in the listing. When you press Enter, *Metro* copies the address into the Clipboard, chooses the Format Normal setting that inserts a carriage return linefeed at the end of each line, Quits, and calls up the Editor accessory.

In the Editor, the macro issues the File Retrieve command and calls up a template file, ENVELOPE.FIL (shown in Figure 12), with the codes that set up the LaserJet



Shown here is Lotus Metro's Editor accessory, with the template file that our macro uses for formatting an envelope and printing the return address. The macro uses Metro's Clipboard accessory to capture the recipient's address and insert it at the end of the template file.

The Ultimate Screen Print And Capture Software

Desktop Publishing

- At last! Transfer any image into your favorite desktop publisher including Ventura Publisher, Aldus PageMaker, and Microsoft Word.
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- Refine and smooth edges for a look that seemed impossible before.



These images were captured with Pizazz Plus, imported into Ventura Publisher and printed.

IBM PS/2 VGA and MCGA

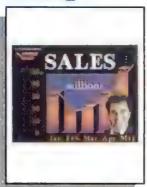


Pizazz Plus printed image from an

- · Deepen blues, enrich reds, and sharpen greens with on screen VGA 256,000 level color adjustment. Color images are automatically converted to gray scales on screen.
- · Go from 4 color printing to full color printing with expanded printer capability.
- Automatically convert text screens to graphics.
- No more printer limitations—what you see on screen is what you'll get on paper.

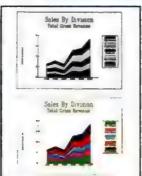
Professional Printing

- For a print out that doesn't look like it was created with a computer, make circles round and flowers soft with the smoothing feature.
- Choose your own standard of measurement, whether it's inches, millimeters, or points.
- Don't loose the detail when sizing your image up or down—*Pizazz Plus* preserves proper aspect ratio.
- Select your print size and position on paper to .01".



Pizazz Plus printed image from an AT&T Truevision TARGA 16.

Resolves Incompatibility



Pizazz Plus printed images from an

- Connect with over 200 printers that's twice as many as most applications support.
- Capture your screens for easy interchange of popular program file formats such as Splash! by Spinnaker and Publisher's Paintbrush by Z-Soft.
- Fully supports high performance image display boards such as the AT&T TARGA 16, AT&T ICB, and ATronics PIB.
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Pizazz Plus Compatible Hardware

IBM PS/2: Models 25 and 30 (MCGA), and Models 50, 60, and 80 (VGA) IBM PC, XT, and AT Display Adapter Cards: ATI Technologies' EGA Wonder, ATronics Professional Image Board (PIB), AT&T Image Capture Board (ICB), Truevision TARGA-16 Hercules Color Card, Monochrome Graphics Card, IBM Enhanced Graphics Adapter (EGA), Color Graphics Adapter (CGA), Monochrome Display Adapter, NEC GB-1 Color Graphics Board, Paradiae AutoSwitch EGA, Plantronics PC + Colorplus Graphics Adapter, Quadram QuadEGA + .
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MAIN.KSM

(AccD){F10}e{F10}ct{TEXT;76;1;Cursor to start of
'address, press F7, to end of address, press End and
Enter){LineIn}{Return}{F10}fn{F10}q(AccE){F10}fr
D:\METRO\ENVELOPE.FIL{Return}{CtlEnd}{F10}p{F10}fp
{F10}ny{Esc}E(F10)fsprn{Return}{F10}q

Figure 11: Type this file in *Metro*'s Editor accessory. Do not press Enter at the end of any line; the line breaks will be slightly different in the actual editing window. If you use a different drive or directory for *Metro*, modify the pathname included in capitals in line 4.

o print an envelope with your return address. The macro presses Ctrl-End (to go to the end of the file) and Pastes the recipient's address into the template file. Then the File Print command prints the envelope.

PORTRAIT RESTORATION Now that we've printed the envelope in landscape mode, we need to send a Reset command to the LaserJet to restore its default portrait mode. Otherwise, the next letter you print may come out in landscape.

Here's where our macro gets very clever. We can't use *Metro*'s Editor to print a file that contains only the "<Esc>E" Reset command because *Metro* always sends a form-feed to the printer at the end of a file, and this would cause the printer to eject a blank page. Instead, the macro creates a New file (after answering Yes to a prompt that asks if it's all right to lose the changes we made to the template file). It

types "<Esc>E" into the file and uses the File Save command to write the file under the name PRN—a command that tricks Metro into sending the file to the printer itself. Metro obediently displays a message saying that it's saving the file as PRN in the current directory, but DOS sends the file to the printer. The macro then Exits from the Editor, and the LaserJet prints your letter.

As with our Keyworks macro, you can refine our Metro macro to include the keystrokes that will make your word processor return to the top of the file, so you can be certain the address will be on-screen when you need it. WordStar users, for example, could add "{CtlQ}R" to the beginning of the listing. If you want to avoid using a template file with the LaserJet codes and your return address, you can include in the macro itself all the keystrokes that create the template file in the Editor accessory. However, it's faster to use the separate template file.

There are two ways to create this macro, by recording the keystrokes or by typing in the text. Whichever you choose, first call up the Editor accessory by pressing Shift-Alt-E and create the ENVEL-OPE.FIL listing shown in Figure 12. Store the file in your \METRO directory. Now you can create the macro itself.

If you create it by recording keystrokes, start with a letter on-screen and call up the Macro accessory by pressing Shift-Alt-M. If you've already created macros, move the cursor to the first blank line. Press L for Learn, press the key to which you want to attach the macro, and enter a brief descrip-



FACT FILE



Lotus Metro, Version 1.1 Lotus Development Corp. 55 Cambridge, Pkwy. Cambridge, MA 02142 (617) 577-8500 List Price: \$85

Requires: 125K RAM, DOS 2.1 or later. In Short: Metro's keyboard macros would be powerful even without its separate accessory programs, but the combination offers a uniquely flexible package. It's not as effective at handling a printer as Keyworks, though. Not copy protected.

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tion. Where the listing has "{AccD}" and "{AccE}", press Shift-Alt-D and Shift-Alt-E. Omit the string that begins "{TEXT" and ends "and Enter}". Where you see "{LineIn}", press Alt-[, then move the cursor to the start of the address, press F7, move it to the end of the address, and press End, followed by Alt-].

When you finish recording keystrokes, press Shift-Alt-M again. You will see the text of your macro, with "{LineIn}" in place of the keystrokes from Alt-[through Alt-]. Edit the text to include the string beginning "{TEXT" and ending "and Enter}", as shown in the listing. Press F10, select Index by pressing Enter, press F10 again, and Quit.

Edward Mendelson is a contributing editor of PC Magazine.

ENVELOPE.FIL

<Esc>E<Esc>41103h6d14E<Esc>4a18L<Esc>(10U<Esc>(sp10h12vsb3T<Enter>
Your name here<Enter>

Your address<Enter>

<Enter>

<Enter>

<Enter>

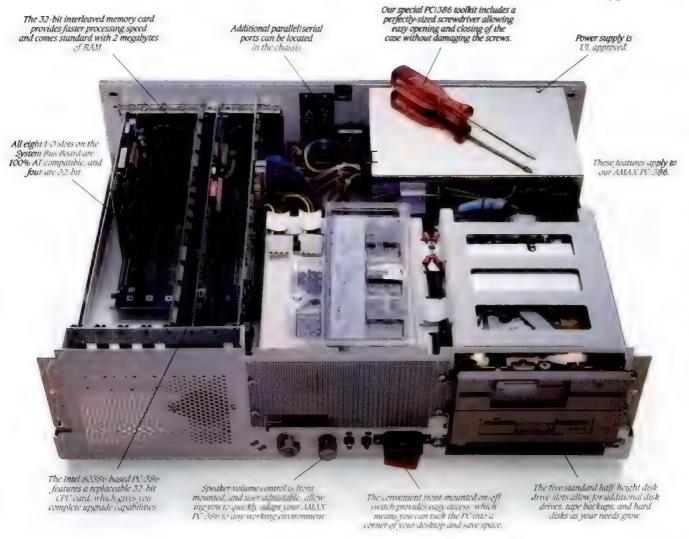
<Enter>

Anywhere down to here Enter>

<Esc>4a55111R

Figure 12: Create this file for the LaserJet Series II in the *Metro* Editor accessory. Modify the return address as needed. Press the Esc key where the listing reads "<Esc>"; press the Enter key where the listing reads "<Enter>". You don't need to include all the lines that have "<Enter>" alone; use as many as you need to position your return address correctly. For the original LaserJet or LaserJet Plus, in the opening line use "(8U", "28E", and "15L" instead of "(10U", "14E", and "15L"; in the last line use "52!" instead of "55!".

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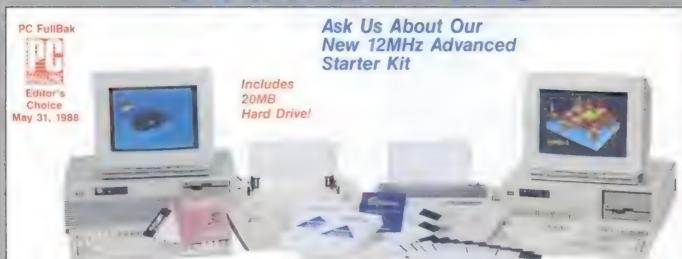
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COMPAQ SLT/286:

Compaq's first laptop has a savvy powermanagement system, lightning-fast video, and an easy-to-love keyboard. But is the price tag too high for portable power?

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Compaq has finally addressed your needs. After several years of contemplation and millions of dollars in research, the company that brought us the first unwieldy, heavy-as-marble portable has put its stamp on a truly mobile laptop designed to appease the most uncompromisingly power-hungry commuters.

Compaq pulled few punches in supplying the SLT/286 with computing power; it runs a 12-MHz CMOS 80286 processor, a 24-mil-



Desktop power combined with innovative battery management; what else did you expect from Compag's first laptop?



The fluorescent backlit LCD screen is VGA compatible with a resolution of 640 by 480.

> The SLT/286 folds up into a snazzy briefcase, but the 2-pound power adapter is more clumsy.

The keyboard of the Compaq SLT/286 is tethered to the CPU by a 2-foot cord; it can rest on top of the main unit when working in close quar-



Take the keyboard off the main unit and you'll find a trap door

A rear view of the machine reveals the standard ports, which are protected from the elements by a snap-on lid.

lisecond 40MB hard disk, and a VGA-level fluorescent backlit display, and it can be crammed with up to 3.6MB of RAM and a 287 math coprocessor. A nickel-cadmium rechargeable battery provides up to 5 hours of life.

The chassis is a gray plastic box that resembles a miniature suitcase and measures 131/2 inches wide by 81/2 inches deep by 4 inches thick. Unlike the NEC and Zenith laptops with which it competes, the SLT/286 makes no concession to fancy styling; no plastic was wasted on mere aesthetics.

The screen, which tilts as far back as 180 degrees, folds over the keyboard in classic clamshell fashion. But the keyboard-in an ergonomic innovation that will make this machine either a must-have for those who don't like being shackled to a one-piece unit, or a turn-off for those who like simplicity at any cost—is mobile, tethered on a 2-foot coiled cord.

The mobile keyboard makes this my favorite among all current laptops because I could sit at a comfortable distance from the screen; even with my less-than-perfect vision, I could comfortably read the VGAmode text from a viewpoint of three feet away. And because the keyboard doesn't need to sit on top of several inches of chassis-as in other designs-and can be placed directly on a desktop, I found myself more at ease when tapping away at the keyboard. (I never fell for the sales pitch of other laptop vendors who said that the handle was built just below the keyboard so you could support your wrists as you type.) Of course, you won't be able to make use of this freedom in an airplane seat, unless you're able to commandeer the tray next to yours. But when the keyboard's properly stowed, the SLT/286 is one of the more compact laptops available.

The handle slides flush into the front panel, centrally positioned to give you the proper center of gravity when carrying it. But you won't want to carry the hefty SLT/286 far without its optional (\$89) case: a well-padded nylon bag that has plenty of pockets, an external pouch, and a scalloped strap that hugs your shoulder. Since it weighs 14 pounds plus the 2pound power adapter you'll need to carry

Compaq SLT/286 vs. Compaq Portable III and Zenith SupersPort 286: Summary of Features

(Products listed in ascending price order)

BASIC CONFIGURATION	Compaq Portable III	Zenith SupersPort 286	Compaq SLT/286	
List price	\$4,999	\$4,999	\$5,399	
Configuration includes	640K RAM 20MB hard disk, one 1 2MB	1MB RAM, 20MB hard disk, one 1 44MB 3½-inch	640K RAM 20M8 hard disk, one 1 44MB 31/2-	
	5' «-inch floppy disk drive	floppy disk drive, DOS 3 21	inch floppy disk drive	
Microprocessor type and speed	80286 (8/12 MHz)	80286 or 80C286 (12 MHz)	80286 (12 MHz)	
Dimensions, HWD (inches)	9.8 x 16 x 7.8	3 x 12.2 x 12.2	4 x 13.5 x 8.5	
Weight (lbs.)	20	10.5 (with battery, 14.5)	14 (with battery pack)	
Keyboard layout	Modified 101-key with numeric keypad	Modified IBM Enhanced with four cursor control keys	Modified IBM Enhanced with four cursor control keys	
SCREEN				
Screen type	Gas plasma	Backlit supertwist LCD	VGA backlit supertwist LCD	
Dimensions, H x W (inches)	5.1 x 8.3	6 x 8	59 x 7.8	
Resolution (pixels)	640 x 400	640 x 400	640 x 480	
POWER				
Tested battery life	61/6	0.40	5.07	
(hours and minutes)	N/A	3:19	0 0,	
Power supply (volts)	110/220	110/220	120/240	

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■ COMPAQ SLT/286



Benchmark Tests: Compaq SLT/286

The Compaq SLT/286's performance in the NOP, 80286 Instruction Mix, Floating-Point Calculation, and Conventional Memory tests is as expected for a 12-MHz 80286-based computer. The other tests tell quite a different story. Disk speeds are extremely fast, a credit to the Compaq's 24-millisecond hard disk, and extended memory timings are equally impressive the VGA display's video speeds must be seen to be believed. Not only are they faster than those of other laptops, they surpass those of the IBM PS/2 Model 80 and the 16-MHz Compac Deskpro 386. In fact, only the video speeds of the new desktop Compags are faster.

The NOP benchmark test is designed to measure raw clock speed and memory access time while minimizing differences in microprocessors and the effect of memory careing. This test executes almost nothing but NOP ("No Operation") machine code instructions in a big 128K loop.

The 50205 instruction M/x benchmark test measures the time it takes to execute a selected series of processor-intensive tasks. The test program uses 80286 instruction code. These instructions are a subset of the total processor instruction set.

The Floeting-Point Calculation benchmark test measures processor speed by looping through a series of floating-point calculations, including multiplication, division, exponentiation, and logarithmic and trigonometric functions. The benchmark program uses the floating-point library included with Microsoft C Compiler 4.0.

The Conventional Memory benchmark test allocates 256K of conventional memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory. The result shown is the average of the read and write times.

The Extended Memory benchmark test allocates 256K of extended memory and treats it as a series of 64-byte records. Then, 16,384 random records are read into and written from this memory. The result shown is the average of the read and write firmed.

The DOS File Access benchmark last measures the throughput rate of the disk being tested. In this case, throughput times are measured in terms of how long the disk takes to perform common DOS file-management functions. Five tasks—file creation, sequential file write, sequential file read, random file write, and random file mad—are itined and the results summed.

The test is carried out for two different types of

files—small-record files and large-record files—that are used by common PC applications. Files created using small records are typically used by database managemen programs, and large records are typically used for word processing and spreadsheet files. Loading a DOS program is also simulated by the large-record test.

The BIOS Disk Seek benchmark test measures the time it takes to do a random seek using the disk's ROM BIOS. The lest result includes minimal software overhead and may not parallel the manufacturer's claimed average access time. The test program performs 1,000 seeks. The average result is shown in milliseconds.

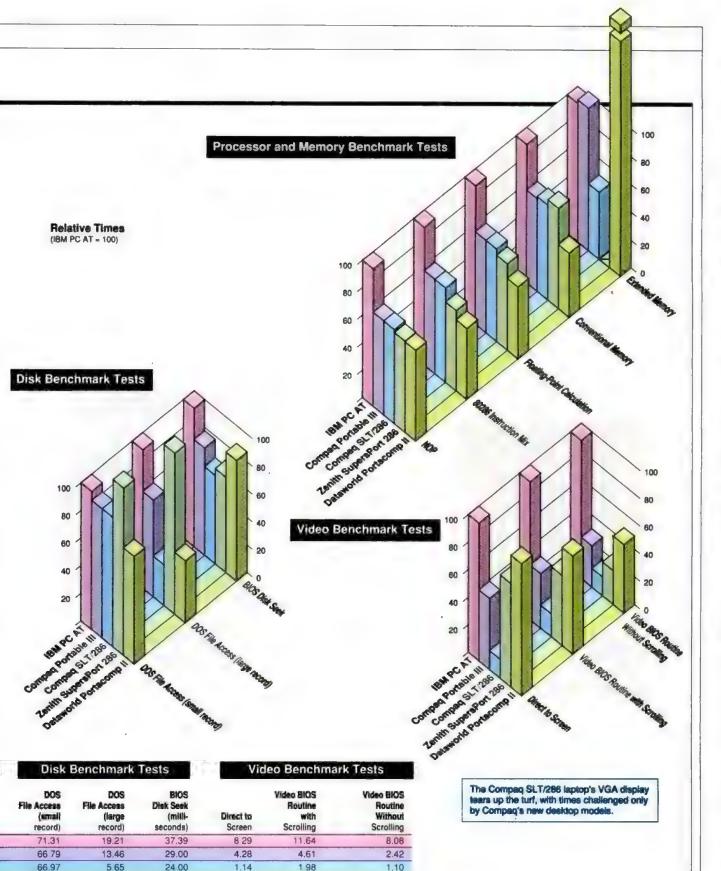
The Direct to Screen benchmark test measures the bandwidth of the video adapter by writing directly to the display memory buffer. The test is performed in video mode 3. The entire screen is updated using the assembly language REP STOSW instruction with register CX equal to 2000. This is done 1,000 times, and the result shown in the total of the 1,000 trials.

The Video BIOS Routine with Scrolling benchmark test measures the speed of the BIOS Teletype routine with scrolling. The test is performed in video mode 3. The screen is cleared and 240 lines of 60 characters each (including a terminating carriage return and line feed) are written to the display through the BIOS Teletype routine. Although the first 24 lines written to the display do not involve scrolling, all the remaining lines scroll the display.

The Video BIOS Routine Without Scrolling benchmark test measures the speed of the BIOS Teletype routine without acrolling. The test is performed in video mode 3. The screen is cleared and 24 lines of 60 characters each (including a terminating carriage return and line feed) are written to the display through the BIOS Teletype routine. This should be the times, and the result shown is the total of the ten trials.

erformance Times imes given in seconds except where noted)	noted)	80206 Instruction Mix	Floating- Point Calculation (without coprocessor)	Conven- tional Memory	Extended Memory
	NOP				
8-MHz IBM PC AT Model 339	4.18	8 79	35.43	1 28	11.61
Compaq Portable III	2.86	6 04	23.76	0.86	11.91
Compaq SLT/286	2 86	6 03	23 79	127.0000	5.60
Zenith SupersPort 286	2.78	5 14	22 19	0 93	NA
Dataworld Portacomp II	2.76	4.56	18.43	0.60	36.52





1.98

4.01

5.93

8.23

86.37

55.60

22.34

8.59

25.85

32.62

6.21

7.91



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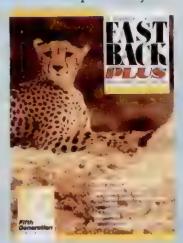
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for recharging, you won't want this baby dangling from your shoulder as you sprint down the corridors of O'Hare, no matter how comfortable the shoulder strap is.

DESKTOP POSSIBILITIES The Compaq SLT/286 could well be termed a convertible, although the folks who created the Houston desktop rockets would shudder at the mere suggestion of any comparison with IBM's poorly-thought-out Convertible. Unlike IBM's aborted attempt, this laptop moves smoothly from desktop to travel modes. Serial and parallel ports are standard equipment, as is a socket for the quick attachment of a VGA display, a full-size keyboard, and external tape or floppy drives. A 31/2-inch drive is standard, and-as this is a Compaq product you don't need to ask-it writes high-density, 1.44MB disks. One nice touch: if the diskette drive is accessing a disk formatted for low-density, the LED indicator glows orange; if it's working in high-density mode, the LED glows green. The internal hard disk drive, whether you have the 20MB or 40MB model, has its own orange LED indicator.

The standard-issue ports will be sufficient if you use the SLT/286 as your desktop machine only occasionally. But if you're thinking of using the SLT as a 9-to-5 desktop and commuter-train portable, you'll probably want both the \$999 optional docking station and the \$299 external storage module that plug into a socket on the rear panel. The docking station provides two 16-bit expansion slots. The external storage module houses the drive and draws power from an AC outlet. You have the choice of hooking up either a 5¼-inch floppy drive, or a 40MB DC2000 tape drive.

That's not a lot for your money, especially when you see that the tape and floppy drives have retail prices of \$799 and \$275, respectively. Compaq justifies this expense with the explanation that their design objective was to provide a departmentwide backup service that could maintain a fleet of portables, spreading out the investment over several machines. It does work well in that environment, but the docking station and external drives are expensive luxuries for a department of one.

If all you want is a high-powered lap-

top, you won't be disappointed by the SLT/286 standing alone. The combination of a fast Conner hard disk and 12-MHz Intel 80286 processor make this a responsive machine, equalling the basic number-

crunching, data-saving power of its closest competitor, the Zenith SupersPort 286. You'll pay about \$400 more for the SLT/286 than for the SupersPort 286, but in addition to the richer expansion options,

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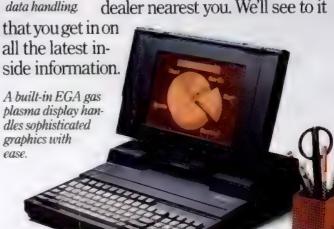
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■ COMPAQ SLT/286

you'll get a machine that positively crackles with fast display writes. You can add RAM to the SLT/286 in 1MB modules, until you reach 3.6MB (having started with 640K).

In the PC Labs benchmark tests, the SLT/286 was about 300 percent faster than the SupersPort 286 on some of the video tests. But you won't need to look at the test results to see a difference; you merely need to run a graphics program. The SLT/286

■ The SLT/286's video performance is a breakthrough for the entire laptop genre.

tames Microsoft Windows applications into submission and pops other displayintensive programs onto the screen with zest. In fact, this fast screen work is a breakthrough for the entire laptop genre: the SLT/286's video performance rivals that of 12-MHz desktop PCs.

While the display—with 16 shades of gray ranging from near-paper-white to almost-black—may not make as stunning a first impression as Zenith's bright blue screens, it proves a better choice in the long run: it's both sharper in writing lines and subtler when emulating shades of color. The brightness and contrast controls command a broad enough spectrum to make this one of the best laptop displays yet. In Windows applications, the sharp dark lines traced on the white background display create an excellent work surface. PageMaker and Microsoft Excel were a pleasure.

The fluorescent backlit LCD does, however, suffer from some of the same physical limitations as its competitors': the thick bright outlines of the two fluorescent tubes are apparent, running horizontally across the screen, and in some graphics modes shadows occasionally trace after long blocks. Still, these problems are less apparent on the SLT/286 than on similar laptops, and they never proved to be serious distractions.

Although I found full compatibility with CGA, EGA, and VGA software, the display has a maximum resolution of 640 by 480, which is just shy of the full VGA complement of 720 by 480 pixels. As a re-

sult, text mode characters are drawn in 8 by 16, rather than 9 by 16, character boxes; the space is saved between characters, but you'd never suspect it. Since none of the VGA modes use a horizontal resolution

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greater than 640 dots, there was no need to change any of the graphics-mode resolutions. Each of the 256 VGA colors is assigned one of the 16 gray shades.

Compaq employs a polarizer and two panels to super-twist the LCD into crisp characters. One interesting side effect is that traces of red and blue can be seen when you view the machine from an extreme angle—a result of the polarizer screening out only part of the color spectrum at that angle.

POWER CONSERVATION Above all, power-conserving strategies embedded in the 286/SLT's design set it apart from competing laptops. In fact, Compaq's setup options (which are on-disk, not in

■ The degree to which the Compaq SLT/286 lets you determine how you use its battery life is unprecedented.

ROM) give you control over more system functions than any laptop setup program I've seen. The setup program lets you select the option of having the screen black out after anywhere from I to 63 minutes of inactivity; touching any key brings it back to life. You can shut off power to the serial and parallel ports; designate the parallel port as LPT1, LPT2, or LPT3 if that will make life easier for you; set hard disk power-down to a period of from I to 21 minutes; or select the starting point for an overall system standby mode from 1 to 21 minutes.

If you tend to access hard disks a lot in your work, you'll probably want to set the hard disk power-down period to a high value, otherwise you'll be waiting about 3 seconds for the 24-millisecond disk to wake up and do its chores. Of course, you're going to sacrifice battery life by keeping the disk drive spinning constantly. It's your choice. The degree to which this laptop lets you determine how you use its

battery life is unprecedented.

Our battery benchmark test yielded 5:07 hours of battery life. The test involves continuous hard-disk access, which creates a highly battery-draining environ-

ment, but because the Compaq SLT/286 turns off its display while the test runs, its power management abilities did come into play. The SLT/286 performed better on this benchmark than any hard disk-based

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laptop to pass through PC Labs yet.

Standby mode is the most visible of Compaq's innovations in power management. Standby mode freezes RAM and video memory while bringing the SLT/286

into a fast hibernation; the system wakes up when you press the "Standby" button on the front panel. It takes about 3 seconds mode.

for the machine to fully shake off its sleep



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The standby power mode comes in three flavors: automatic, manual, and emergency. In automatic mode, the system takes itself into standby mode whenever you leave the 286/SLT idle for a preset period of time. The default period is 10 minutes, but it can range up to 21 minutes. If you are running an application that this disturbs-such as some types of real-time monitoring systems—you can disable the automatic standby feature. The 286/SLT will notify you that it's going into standby power mode with a couple of beeps, and a blinking LED will remind you that it's continuing to operate in that mode.

To return to normal power operation, just press the switch marked "Standby" on the front panel of the 286/SLT. The standby switch is also used to manually put the laptop into standby power mode. It's handy for times when you plan to stop using the 286/SLT for a short while but don't wish to close down what you're doing by shutting the power off.

Standby's emergency mode works at two levels. When the 286/SLT's battery has been drained to 10 percent of its power capacity, the system goes into an alert status and notifies you by beeping and flashing a low battery LED. Two different courses of action are defined by the power conservation system once the first low-battery alert status has been reached.

If the system remains idle for 2 minutes while in battery alert status, the power conservation system takes it into standby power mode and alerts you of its move by additional beeping and by flashing the lowbattery LED. If you do not have access to 120V power to recharge the system, you can use the standby switch to bring the 286/SLT out of standby power mode, save your data and switch the system off. At this point, you can change the battery pack if you are carrying a spare.

If you continue to use the laptop even though battery alert status has been indicated and the battery is drained to 5 percent of its capacity, it goes into standby mode and indicates its move. However, in this case you cannot bring the system out of standby mode unless you first plug it into a 120volt source of power. That means you can't save any data currently in memory unless you find a wall plug. By this time it's too late to insert a fresh battery pack,



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Just call 1-800-637-7878, correctly identify the Top Dot, and

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CIRCLE 317 ON READER SERVICE CARD

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■ COMPAQ SLT/286

because that can only be accomplished with system power switched off.

In most cases, the warnings are sufficient, and you'll easily be able to safely save data, power down, and swap-in a freshly charged battery. There's no auxiliary battery charger, so you'll need to devote some of the machine's downtime to keeping a spare ready to go (it takes about 90 minutes to charge a drained battery if the laptop's not in use; batteries recharge in about 3 hours when the machine is running on AC power).

The modern strategy is somewhat different. You can control whether the modern is switched on or off when you switch system power on, but after that there is no automatic timeout to turn the modern off separately. If you want power to the modern switched off to conserve power, you must do it manually.

FINAL IMPRESSIONS Overall, it's an impressive machine. Certainly you'll wish they could have shaved a few pounds off; I know I did, every time I carried it for more than a few feet. You'll probably also wish the battery life were longer; even with the

■ You may love the SLT/286's mobile keyboard, and the freedom the cord offers.

elaborate power management design, I averaged only 3 hours of word processing and spreadsheeting (you can stretch your power by keeping the display at a low brightness, although you probably won't want to).

The bottom line may be that you'll quickly fall in love with the mobile keyboard. If you use a PS/2-style 101-key keyboard (like those on Compaq Deskpros) you'll feel right at home. The Ins, Del, and Esc keys are right where you expect them to be, the 12 function keys are full-size, and there's a separate cursor pad. You do share the cursor keys with Arrow and PgUp, PgDn, Home, and End func-



FACT FILE

Compaq SLT/286 Compaq Computer Corp. 20555 FM 149 Houston, TX 77070 (713) 370-0412 (800) 231-0900

List Price: Model 20 with 640K RAM and 20MB hard disk, \$5,399; Model 40 with 640K RAM and 40MB hard disk, \$5,999; 1MB RAM modules, \$799; external 360K floppy disk drive, \$275; external 1.2MB floppy disk drive, \$275; external storage module, \$299; external 40MB tape drive, \$799; desktop expansion unit, \$999; external numeric keypad, \$149; second optional battery pack, \$129; carrying case, \$89; OS/2, \$325.

In Short: Compaq's first laptop is speedy overall with superfast VGA graphics. At 14 pounds, it's no lightweight and with all options it's expensive, but there's power enough in it to run Windows applications and OS/2.

CIRCLE 643 ON READER SERVICE CARD

tions, but the Fn key is easy to reach. In typical laptop fashion, a number keypad overlaps the main keyboard, and, commendably, the markings on the shared letter-number keys are clearly marked. If you do lots of figure entry, you can order a \$149 external number keypad that plugs right into the keyboard. If you're working in a tight space, keep the keyboard snugly fitted into the unit, but you'll also enjoy the freedom that the cord offers.

Not everybody needs a laptop that runs OS/2, yet Compaq has signalled its intention to build a high-end portable by making OS/2 available for the SLT/286. In fact, a Compaq engineer told me that the goal of overall compatibility was so fully met in this machine that there was no need to develop special OS/2 drivers for the SLT/286; most laptops will require special OS/2 drivers to ensure compatibility with their unique disk and video management.

Not everybody wants to spend \$5,399 for the Model 20 with 1MB RAM and a 20MB hard disk, and even fewer will want to spend over \$9,000 for a laptop with enough RAM and disk space to run OS/2.

Ordinary mortals need not be concerned: this laptop speaks to the souls of super power users and to no one else.

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HELP FILE

Volume 7 Number 21 December 13, 1988

Graphics and Screen Statements

LINE — Draws a line or box on the screen SYNTAX: LINE [(x1,y1)]=(x2,y2) [,[color] [,B[F]][,style]] (x1,y1) = coordinates for one end of line or corner of box. Default current location if omitted. (x2,y2) = coordinates for other end of line or corner of box color = color/attribute to draw with B = draw a box rather than a line BF = draw a filled box style = integer containing bit pattern for noncontinuous line, for example, 101010101010101010 8.HAAAA

for dotted line. Style not permitted with filled boxes.

LOCATE — Place and define cursor (text mode only)
SYNTAX: LOCATE [row][.[co/][.[cursor][.[star/][.stop]]]]
row = 1..25
col = 1..80 or 1..40, depending on screen width
cursor = 0 for hidden cursor, 1 for visible

col = 1.80 or 1.40, depending on screen width cursor = 0 for hidden cursor, 1 for visible start, stop = start and end scan lines for cursor (0..7 for color, 0...13 for mono)

PAINT — Fill an area with a color
SYNTAX: PAINT (x,y) [[,paint] [,boundary] [,background]]
(x,y) = a point inside area to be filled
paint = if numeric, color attribute to fill with.
If string, area is filled with bits corresponding
to bytes in the string ("tiling").
boundary = color attribute defining edges of area
to be painted
background = 1-byte string used in tiling

PRESET — Draw a point in graphics mode SYNTAX: PRESET (x,y) [.color] NOTE: Identical to PSET except that color defaults to 0.

PSET — Draw a point in graphics mode SYNTAX: PSET (x,y) [,color] (x,y) = coordinates of point color = color of point. Default 3 in medium resolution, 1 in high resolution.

PUT — Plot a graphics image stored with GET SYNTAX: PUT (x,y), array [,action] (x,y) = coordinates of top left corner of image array = numeric array containing image action = interaction with data already on-screen

PSET put exact image
PRESET put complementary image
XOR XOR image with screen
AND AND image with screen

SCREEN — Set screen attributes
SYNTAX: SCREEN [mode] [[[burst]] [[apage] [[vpage]]]
mode = 0, 1, or 2.0 = text mode, 1 = mediumresolution graphics mode, 2 = high-resolution
graphics mode.
burst = true (nonzero) for color, false (zero) for no color
apage = active page. Selects page to be written to
(text mode only).
vpage = visual page. Selects page to be displayed
(text mode only).

VIEW — Define a viewport

SYNTAX: VIEW [[SCREEN] {(x1,y1)-(x2,y2)}
[,[color][,[boundary]]]]

SCREEN = If absent, all points are plotted relative to viewport; if present, points are absolute but those not in viewport are not visible.

(x1,y1)-(x2,y2) = corner coordinates of viewport color = color attribute to fill viewport with boundary = color attribute for frame around viewport

WINDOW — Redefine coordinates of viewport SYNTAX: WINDOW [[SCREEN] (x1,y1)-(x2,y2)] SCREEN = If present, y values increase from top to bottom; otherwise y values increase from bottom to top.

(x1,y1)-(x2,y2) = world coordinates. When WINDOW is active, BASIC translates from world to physical coordinates.

Event-Trapping Statements

COM(n) — Enable/disable trapping of communications activity

SYNTAX: COM(n) ON/OFF/STOP

n = number of communications adapter (1 or 2)

ERROR — Simulate a BASIC error SYNTAX: ERROR n

n = 0..255. For user-defined errors, use values > 200.

KEY — Set key trap
SYNTAX: KEY m.CHR\$(KBflag) + CHR\$(scancode)

m = numeric expression from 15 to 20
KBflag = mask for shift keys. To compose mask, add
the appropriate values from the following table,
for example, to trap Ctrl-Alt-Esc, "KEY 15, CHR\$(&H08
+ &H04) + CHR\$(1)".
Right Shift
&H02

H02

H03

H04

H05

H05

H05

H06

H06

H07

H07

H07

H08

H07

H08

H08

KEY(n) — Enable/disable trapping a specific key SYNTAX: KEY(n) ON/OFF/STOP

n = numeric expression 1..20
1..10 Function key F1..F10
11 Up Arrow
12 Left Arrow

12 Left Arrow
13 Right Arrow
14 Down Arrow
15..20 Keys defined by KEY m,
(CHR\$(KBflag)

+ CHR\$(scancode)

ON COM(n) — Set up communications trapping SYNTAX: ON COM(n) GOSUB subline n = 1 or 2 (number of comm adapter)

ON ERROR — Enable error trapping SYNTAX: ON ERROR GOTO subline

-Neil J. Rubenking



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PRODUCTIVITY

■ PC LAB NOTES: SPREADSHEET ANALYSIS ■ ETHAN WINER AND PHILIP MARTIN VALLEY

CRACKING THE LOTUS SPREADSHEET CODE

Manipulate the data in your 1-2-3 worksheets by writing your own application programs in QuickBASIC 4.0. The programs and examples presented here will show you how.

The very popularity of Lotus 1-2-3 virtually guarantees a large number of users who will want to stretch the program beyond its designed capabilities. Programming languages have long been used to manipulate printouts and .DIF files, and this article will provide you with the tools and examples you need to access 1-2-3 worksheets through Microsoft's easy-to-use QuickBASIC 4.0. (Lotus spreadsheet files include those in 1-2-3 and Symphony. But for simplicity, we will hereafter refer to them as 1-2-3 files.)

Two new features of QB 4—its support of binary file access and its ability to handle IEEE-format numbers—make it possible to read and write 1-2-3 data files directly. Earlier versions of QuickBASIC could access 1-2-3 files only by the technique of treating them as multiple 1-byte randomaccess records. BASIC—at least in the dialect spoken by Microsoft—was unable to read or write the IEEE floating-point format where 1-2-3 stores numbers.

With the newfound ability to speak (and listen) to 1-2-3, the only remaining problem is to understand the 1-2-3 file layout. Here the work has been done by Jeff Walden, in his File Formats for Popular PC Software (John Wiley & Sons, 1986; ISBN 0-471-83671-0). Besides providing a complete description of the 1-2-3 file structure, Walden covers many other important file formats, and much of the information contained in this article is derived from his excellent book.

Reading and writing 1-2-3 files is not unlike other programming chores in that you'll probably want to split the task

among several subroutines. For that reason, we'll present routines you can easily separate into code fragments in order to read and write floating-point numbers, integers, and text labels.

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LOTUS FILE BASICS 1-2-3 creates files that are intended to be read and written sequentially. Because of their varying lengths, they should be accessed through BASIC as binary files. Unlike conventional sequential files, data in binary files is not delimited by a carriage return/line-feed or comma, nor are text strings enclosed in quotation marks. Furthermore, when a file is read using binary access, BASIC does not treat CHR\$(26) as an end-of-text marker. This is an important consideration because that character value is just as likely to occur as any other in a Lotus worksheet file.

A 1-2-3 file may contain as many as 63 different kinds of records. We can safely limit our attention here, however, to the handful that play an essential role in transferring the information between a BASIC application and a 1-2-3 spreadsheet. When reading or writing 1-2-3 files, a BASIC program must be able to handle the following six types of records: Beginning of File, End of File, Integer numbers, Floating-Point numbers, Text labels, and Formula values.

Other 1-2-3 data records, such as those for range names, window sizes, macro definitions, printer setup strings, and the order of calculation deal more with the operation of the spreadsheet than with the data itself. The records we're ignoring here in the interest of space are no more difficult to read or process, however, and if you want more information about their structure, Walden's book provides a complete description of each record type by opcode.

■ PC LAB NOTES

Regardless of its type and the information in it, every *1-2-3* data record follows the same layout as follows:

<Opcode> <Length> <Data>

The opcode is always a 2-byte integer that signifies the type of data that is to follow. The opcode 15, for example, tells us that the data section of the record contains information that 1-2-3 will interpret as a text label. The length is also a 2-byte integer; it reports the number of bytes in the data section that follows.

All of the record types that pertain to a specific cell contain five header bytes at the start of the Data portion of the record. These 5 bytes are included in the Length word at the start of each record. The first header byte contains formatting information such as the number of decimal digits to display. The second 2 bytes together hold the cell row in which the data is to go, and the next 2 hold the column. However, records that concern the spreadsheet itself (such as those that specify manual or automatic recalculation) do not contain this

header, nor do the Beginning-of-File and End-of-File marker records.

Different kinds of records use different data lengths, of course, depending on the information they contain. Many, however, will have a set length. The length of a floating-point number, for instance, is always 8 bytes; an integer is always 2 bytes long. Because the Length word also includes the 5-byte header size, its totals in these cases would be 13 and 7, respectively. Other records, most notably labels and cell formulas, have a variable length.

READING LOTUS DATA FILES In the routines presented here, reading a data file created by 1-2-3 will always follow the same procedure. That is, you will use GET to read the data type, length, and header information. Then, the correct number of data bytes will be read into the appropriate variable type. The files are always read and written sequentially, from start to end.

Note that each time GET (or PUT) is used to access data in a binary file, the DOS file pointer is automatically incremented to the next position in the file. The BASIC SEEK command can also position the DOS file pointer, and our routines use it for this purpose when it is necessary to skip over unwanted records.

The READ123.BAS program printed here shows all of the steps necessary to read a 1-2-3 worksheet in QuickBASIC 4.0. It will read any 1-2-3 worksheet file and display its contents on the screen. Routines are provided to decode and display the 1-2-3 version number, integers, floating-point numbers, labels, and formula values. All other record types are skipped, although their opcodes are displayed.

READ123 begins by asking for the name of the worksheet to be read. If a filename is not given, a list of files on the default drive is displayed. The QuickBASIC 4 FREEFILE function is then used to determine the next available file handle. The variable that contains the number of the file handle is declared at the beginning of the program as SHARED, which allows all of the subprograms to access it. This

```
PERSONAL PERSONAL PROPERTY OF THE PERSONAL PROPERTY OF THE PERSON PR
                                                                                                                                                                                                               GET FileNum, , Number#
PRINT "Number: "; Formet, "Row ="; Row, "Col ="; Column, Number#
 'Copyright (c) 1989, Eiff Communications Co.
'PC Magazine * Ethan Winer * Martin Valley
'Reads a file written by Lotus 123
                                                                                                                                                                                                               OetFormat Format, Now, Column
Info$ = SFACE$(Length - 6)
                                                                                                                                                                                                                                                                                     'create a string to hold the label '6 is subtracted to exclude the
DECLARE SUB GetFormat (Format, Row, Column)
                                                                                                                                                                                                                                                                                     ' Format, Column, Row, and 0 bytes ' that were included in the original
                                                                                        'the file number to use
DIM SHARED FileWom
                                                                                         'allows reading one byte
DIN SHARED Cullyut AS STRING * 1
                                                                                                                                                                                                                                                                                           length byte (already gotten by the
                                                                                                                                                                                                                                                                                      getFormat routine;
get the label text
                                                                                                                                                                                                               GET Filemum, . Info$
                                                                                                                                                                                                              GET FileNum, , CellPmt$ 'gobble up the trailing CMR$($) byte
PRINT "Lebel: "; Format, "Row ="; Row, "Col ="; Column, Info$
     IMPUT "Enter name of Lotus file to read: ", FileHames IF FileHames = "" THEM FILES "".WK?"
LOOP UNTIL LEM(FileName$)
                                                                                                                                                                                                             GET FileNum, , Number | 'get the cell's value | 'get length of formula "text" | GET FileNum, , Length | 'get length of formula "text" | GET FileNum, SEEK(FileNum) + Length 'akip over the formula 'the formula is "tokenized" in reverse | 'maliah motation - not a pretty story'
                                                                                         'obtain the next available file handle
OPEN FileHame$ FOR BINARY AS $FileHum 'open the file for Binary access
DO UNTIL Opcode = 1
                                                                                         'until the Lotus "End of File" Opcode
      GET FileNum, , Opcode GET FileNum, , Length
                                                                       'get the next opcode
                                                                                                                                                                                                              'Polish notation - not a pretty story'
PRINT "Formula:"; Format, "Row ="; Row, "Col ="; Column, Number#
                                                                   'and the length of the data that follows
      SELECT CASE Opcode
                                                                      'handle the data according to its type
                                                                                                                                                                                                                                                                 'anything else merely relates to the way the 'spreadsheet operates (recalc order, print ranges, and so forth)
                                                                                                                                                                                                         CASE ELER
                   FE 8 'Beginning of file record (and varsion)
GET FileNum, , Integ 'Integ holds the version number
            CASE #
                                                                                                                                                                                                              Dummy$ = SPACE$(Length)
GET FileNum, , Dummy$
PRINT "Opcode: "; Opcode
                                                                                                                                                                                                                                                                                      'skip over the unwanted record
                   IF Integ < 1828 OR Integ > 1838 THER   'test this if you want
                                                                                                                                                                                                                                                                                    'show its Opcode just for fun
                   PRINT "BOF: Lotus ";
                                                                                          'Version number is the only
                                                                                                                                                                                                  IF CERLIN > 21 THEM
                                                                                                information in this record
                                                                                                                                                                                                        PRINT : PRINT "Press <ESC> to end or any other key for more . . ."
                                                                                                                                                                                                        DO: K$ = INKRYS: LOOP UNTIL LEW(K$)
                            CASE 1828
                                   PRINT "123 version 1.8 or 1A"
                                                                                                                                                                                                        IF K$ = CRR$(27) THEN EXIT DO
                             CASE 1829
                                                                                                                                                                                                 END IF
                                  PRINT "Symphony version 1.8"
                                   PRINT "123 version 2.5, 2.1, or Symphony version 1.1"
                                                                                                                                                                                                  Catr - Cutr + 1
                                                                       'Blank - NOTE: Lotus saves blank cells only
                                                                             if they are formatted or protected
                                                                                                                                                                                                 PRINT "Number of Records Processed =" | Cutr
                   GetFormat Format, Row, Column
                   PRINT "Black: ": Format, "Bow #": Bow, "Col #": Column
                                                                                                                                                                                          CLOSE
                                                                                                                                                                                          SUB GetFormat (Format, Now, Column)
                   GetFormat Format, Nov. Column
                                                                                                                                                                                                        GET FilaHum, , CellFat$: Format = ASC(CellPat$)
                   FRINT "Integer:"; Format, "Now ""; Now, "Col ="; Column, Integ
                                                                                                                                                                                                        GET FileNum, , Column
                                                                                                                                                                                                       GET FileRum, , Row
                                                                       'Real number (BASIC double precision type)
                   GetFormat Format, Row, Column
                                                                                                                                                                                          END SUB
```

READ123.BAS: This program, written in QuickBASIC 4.0, will read and display all the data records in a Lotus 1-2-3 worksheet file.

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procedure is somewhat simpler than the alternative of passing the file number as a pa-

rameter to each subprogram.

FREEFILE is particularly useful for creating subroutines that will be used in other programs later. Before FREEFILE, it was up to you to assign and keep track of which file numbers were in use. But in a subprogram that may be added to several other programs, it is not obvious which numbers are currently available. FREEFILE always returns the next one available, which guarantees that a duplicate number will not be inadvertently assigned.

Once the worksheet file has been opened, a series of GETs is used to process each record in the file. Because every record has the opcode and length bytes, these are always read first. Then, depending on which opcode was read, the program branches to code that is appropriate for the type of data that will follow. What your program does with the data will, of course, depend on the individual application. The READ123 program simply displays the file contents on the screen.

READ123 is structured as a DO/LOOP, and each record is read and filtered through a series of CASE statements to process them appropriately. Since most of the records contain a format byte and a row and column number, a subprogram has been set up to read and interpret these five header bytes. When the End-Of-File opcode of 1 is encountered, the program closes the file and ends.

BINARY GET AND PUT When used for binary file access with QuickBASIC 4, the GET and PUT statements are implemented very differently from their random-access counterparts. The random GET and PUT always operate on an entire record whose size was indicated when the file was first opened. However, in binary files a variable is always specified as the source or destination, and the size of the variable indicates how many bytes are to be read or written.

Thus, to write the integer variable X% to a file, you would use PUT thus:

PUT #FileNum, Offset, X%

This writes the 2 bytes contained in the integer variable X% into the file at the specified offset. The Offset variable is optional,

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■ PC LAB NOTES

and if it is omitted, the data will be written at the current file pointer location. Note, however, that the delimiting comma must still be included. Because READ123.BAS reads a worksheet file sequentially, the Offset parameter is not needed or used.

The syntax for GET is similar to that for PUT: the file number and variable name are given and the offset variable is optional. Thus, to read 8 bytes from a binary file into a double-precision variable, you would use GET like this:

GET #FileNum, Offset, D#

Reading and writing string variables follows the same method in that the length of the string determines how many bytes will be read or written.

Notice that when using PUT (unlike the other BASIC file commands) a variable *must* be specified. A constant value or a string may not be used. For example, all of these statements are illegal:

PUT #FileNum, , 3

PUT #FileNum, , CHR\$(X)

PUT #FileNum, , STRING\$(X, "A")

There seems to be no reasonable justification for this limitation in QuickBASIC, but Microsoft has, unfortunately, indicated that they have no plans to correct it.

INTERPRETING CELL CONTENTS

The only opcodes that READ123.BAS will process are 0, 1, 12, 13, 14, 15, and 16. All others are ignored. Each type of data record is handled by a separate CASE statement appropriate to the type of data and the number of bytes to be read and processed. We'll discuss each case in turn.

Case 0 is the Beginning-of-File record. If you are certain that the file being read is a valid 1-2-3 file, then this record could be ignored. The data associated with the Beginning-of-File record indicates which version of 1-2-3 created the file. If an invalid version number is read, READ-123.BAS assumes that the file was not created by 1-2-3 and the program ends.

The only version numbers (as of this writing) that will be encountered are 1028, 1029, and 1030. Files created by *Lotus 1-2-3* Version 1 or 1A are designated by 1028; 1029 indicates a *Lotus Symphony* file; and 1030 is either a *1-2-3* Version 2 or *Symphony* 1.1 file.

Case 1 is the 1-2-3 End-of-File marker.



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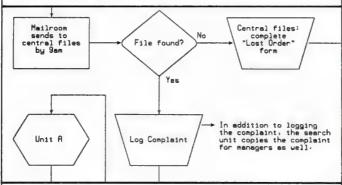
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■ PC LAB NOTES

and it is always the very last record in the file. Because there is no data, this record has a length of zero.

Case 12 indicates a blank cell in the spreadsheet. The format byte and the row and column numbers are the only data in a blank cell record. Notice that these records exist only for protected or formatted blank cells—other blank cells are not saved by 1-2-3.

Case 13 is a cell that contains an integer value (a whole number in the range of -32,768 to +32,767). After calling the GetFormat subprogram to obtain the format, row, and column numbers, the integer value is read and displayed.

Case 14 indicates a real (double-precision floating-point) number and is handled similarly to an integer, except that 8 bytes of data are read rather than only 2.

Case 15 is a text label. As with the others, the format, row, and column must be obtained first. However, before the label can be read, we must know how long it is. The length of the data was read in the second line of the DO/LOOP, and this is the first time we've needed to be concerned about it.

To determine the length of the label itself, 6 must be subtracted from the indicated length to adjust for the format, row, and column bytes, and the CHR\$(0) that marks the end of the string. Because GET uses the length of the destination variable to know how many bytes are to be read, an empty string variable is first defined to receive the text.

Info\$ = SPACE\$(Length - 6) GET #FileNum, , Info\$

The GET statement then reads the label data. The last byte in each label record is always CHR\$(0), the null character. We could have used SEEK to skip past that byte, but it's easier simply to read it into a dummy 1-character string. Because GET (and PUT) automatically increment the DOS file pointer, this is just as effective as using SEEK.

Case 16 is the opcode for a formula, which is the last type of data record with which we are concerned. The formula itself is tokenized, so that a single byte may be used to represent several characters. For example, the #AND# keyword is stored as a byte with a value of 20.

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■ PC LAB NOTES

The value of the resulting calculation is also kept in the file, however, and it is stored as a floating-point number. Therefore, a formula record may be read just as if it were a number record, although to do so the formula itself must be skipped before subsequent records may be accessed. Again, this is done by defining a dummy variable with the correct length and then reading the formula data into that variable.

The CASE ELSE clause is needed to skip past unwanted records. By simply GETting the correct number of bytes into a dummy variable, the program will be ready to read the next record, whatever it may be. The opcode is printed simply to show that it was encountered, but most BASIC applications would probably do nothing with it.

Even if we didn't care about displaying nonnumeric cells, a CASE ELSE would still be needed to avoid the "Illegal function call" error that would result if an opcode had no corresponding CASE. This mandatory inclusion of a CASE ELSE is

an unwarranted nuisance in QuickBASIC programming. After all, if an IF test fails, the program simply proceeds to the next statement. Hopefully, Microsoft will change CASE to work like that in a future QB release.

THE FORMAT BYTE Although the READ123 program merely displays the cell's format as a value, there's a lot of information packed into that single byte. As diagrammed in Figure 1, the format byte comprises three separate fields, each represented as a series of bits. You can isolate the individual bits in this byte fairly easily by using the BASIC AND and OR statements as described below.

The highest bit (bit 7 in Figure 1) indicates whether or not the cell is protected. This bit is either 1 if the cell is protected, or 0 if it is not. The code fragment below shows how to isolate and test this bit.

IF Format AND 128 THEN PRINT "This cell is protected"

Likewise, when you're writing a cell to the

file (which we'll discuss shortly), the protected status may be assigned by using OR to set the bit.

Format = Format OR 128

Bits 4 through 6 describe the type of format, which applies to numeric and formula cells only. Because 3 bits are used to indicate the format type, there can be only eight possible values (0 through 7). The coding for these bits is shown in Figure 2.

The lowest 4 bits in the format byte are used to indicate the number of decimal places to display (0 to 15) if the cell is numeric or a formula. If the format type is designated as "other" (see Figure 2), then bits 0 through 3 carry the meanings shown in Figure 3.

WRITING LOTUS DATA FILES Writing a file for use by Lotus 1-2-3 is actually easier than reading a file created by 1-2-3 because fewer record types are involved. Many of the records that Lotus worksheets create are not necessary and may be omit-

```
SUB WriteInteger (Now, Column, ColWidth, Integ)
 ********* WRITE123.BAS
 'Copyright (c) 1988, Wiff Communications Co.
'PC Magazine * Ethan Winer * Martin Valley
'Writes data to a file readable by Lotus 123
                                                                                                                                                                      'OpCode for an integer
                                                                                                                              Temp = 13
                                                                                                                              PUT FileNum, , Temp
                                                                                                                                                                      'Length + 5 byte beader
                                                                                                                              Temp = 7
PUT FileWum,
                                                                                                                              Temp$ = CHR$(127)
PUT FileHum, Temp$
PUT FileHum, Column
                                                                                                                                                                      'the format portion of the header '(use CHR$(255) for a protected field)
DECLARE SUB WriteColWidth (Column, ColWidth)
DECLARE SUB WriteWumber (Now, Column, ColWidth, Fmts, Numbers)
DECLARE SUB WriteInteger (Now, Column, ColWidth, Integ)
DECLARE SUB WriteLabel (Now, Column, ColWidth, Msqs)
                                                                                                                             PUT FileWum, , Now
PUT FileWum, , Intg
DIN STARED COLUM(40)
DIN STARED FileNam
                                  'the maximum number of columns to be written 'the file number to use
                                                                                                                              CALL WriteColWidth(Column, ColWidth)
                                                                                                                        EMD GUR
FileBon - FREEFILE 'get the next avail
OFFH "FEADWRIT.WES" FOR BIHARY AS $FILEBUM
                                   get the next available file number
                                                                                                                        SUB WriteLabel (Row, Column, ColWidth, Mag$)
                                   'OpCode for Start of File
                                                                                                                             IF LEW(Mag$) > 248 THEN Mag$ = LEFT$(Mag$, 248)
PUT FileMum, , Temp
                                  'the data length is 2 (for the following integer)
                                                                                                                             Temp = 15
FUT FileNum, , Temp
                                                                                                                                                                      'Opcode for a label
PUT FileHum, , Temp
Temp = 1828
PUT FileHum, , Temp
                                                                                                                             Tump = LEN(Hegs) + 7
PUT FileNum, Temp
Temp$ = CHR$(127)
PUT FileNum, Temp$
PUT FileNum, Temp$
                                   'the Lotus version number
                                                                                                                                                                     'Length + 5-byte header + "'" + CHR$(8) byte
                                   'Mote: Lotus version 1 = 1828; version 2 = 1838
                                                                                                                                                                      '127 is default format for unprotected cell
                                   'row numbers in Lotus begin with #
                                                                                                                              PUT FileHum, , Column
   WriteLabel Row, 8, 16, "This is a Label" WriteLabel Row, 1, 12, "So's This" WriteInteger Row, 2, 7, 12345 WriteHumber Row, 3, 9, "C2", 57.236 WriteHumber Row, 4, 9, "F5", 12.34547898 WriteInteger Row, 6, 9, 99
                                                                     'a label 
'another label
                                                                                                                              FUT FileNum, , Row
Temp$ = "'" + Meg$ + CMR$(#) 'NOTE: "'" means label will be left aligned
                                                                    'an integer
                                                                     'a number: $57.23
                                                                                                                             PUT FileMum, , Temp$
CALL WriteColWidth(Column, ColWidth)
                                                                      another number
                                                                     'it's okay to skip a column
LOOP WRILE BOW < 6
                                                                                                                        SUB WriteHumber (Row, Column, ColWidth, Fats, Number#)
'Write the "End of File" record and close the file
Temp = 1 'OpCode for End of File
                                                                                                                              IF LEFT$(Fmt$, 1) = "F" THEM
Formet$ = CHR$($ + VAL(RIGHT$(Fmt$, 1)))
                                                                                                                                                                                                    number of decimal places
Temp = 1
PUT FileWas, , Temp
                                                                                                                              ELSEIF LEFTS(FMtS, 1) = "C" THEN
FormatS = CMTS(32 + VAL(RIGHTS(FmtS, 1)))
                                                                                                                                                                                                    currency ..
                                   'its Date length is zero
                                                                                                                                                                                                    number of decimal places
                                                                                                                              ELSELF LEFTS(FmtS, 1) = "P" TREE
PormatS = CHR$(48 + VAL(RIGHT$(FmtS, 1)))
PUT FileHum, , Temp
                                                                                                                                                                                                    'percent ...
'number of decimal places
CLOSE
                                                                                                                                  Formats - CHR$(127)
                                                                                                                                                                                                    'ues default format
SUB WriteColWidth (Column, ColWidth)
                                                                                                                                 Pozmat# = CRRS(255)
                                                                                                                                                                                                   'optional to protect cell
                                                           'if width record not already written
     IF ColWum(Column) = # THEM colWidth = 9 'default to 9 if no value
                                                                                                                              Temp = 14
                                                                                                                              FUT FileNum, , Temp
                                                                                                                              Temp = 13
PUT FileNum, , Temp
          POT FileNum, , Temp
          PUT FileNum, , Temp
                                                                                                                              PUT FileHum, , Format$
                              Columb
          PUT Fileman.
                                                                                                                              PUT FileWum, , Column
          Temp$ - CHR$(ColWidth)
                                                                                                                              PUT FileWum, , Now
         POT FileHum, , Temp$
ColBum(Column) = 1
                                                           'show we did this one for later
                                                                                                                              CALL WriteColWidth(Column, ColWidth)
                                                                                                                       EMD EUR
```

WRITE123.BAS: The subroutines in this QB 4 program cover all the functions you will need to write records that can be read by Lotus 1-2-3.

ted without impairing the ability of 1-2-3 to read and process the file. The program listing WRITE123.BAS shows how to create a 1-2-3-compatible worksheet file and writes all of the cell types described thus far.

As with READ123.BAS, this program uses FREEFILE to obtain the next available handle and then opens a file for binary access. While any filename could be used, using the .WKS extension ensures that any version of *Lotus 1-2-3* will be able to read the file. If you're sure the file will be read by *I-2-3* Version 2.0 or 2.1 only, a ".WK1" extension may be used instead.

Once the file has been opened, the first record to be written must be Lotus's Beginning-Of-File record. The opcode for this record is 0, the length of the data section is 2 bytes, and the data consists of a 2-byte integer indicating the version of 1-2-3 that created the file. Again, we recommend using 1028 unless you are certain that the file will be read by only 1-2-3, Version 2.

After the mandatory BOF record has been written, we may now write however many data records are needed. We will assume here that the data will consist of either numbers or text strings, and that the numbers will be either integers or floatingpoint numbers.

WRITING THE CELL CONTENTS

Since three different kinds of records are being written, three separate subprograms are provided—one for integers, one for numbers, and another for text labels. Each of these subprograms is designed to expect a row, a column, a column width, and a value argument. The WriteNumber subprogram also expects a format string, which we'll look at in a moment. A call will be made to one of these subprograms for each cell written to the file.

It's important to understand how 1-2-3 maintains the row and column information. As you obviously know, the program uses letters for column designations, but this is true only when communicating with the outside world. Internally, both rows and columns are numbered, and these numbers start with zero instead of one.

Row 1, therefore, is row 0 to 1-2-3, and column A is really column 0. You must keep this in mind when writing a 1-2-3 file,

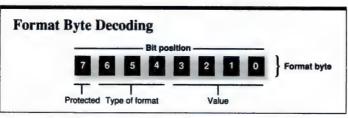


Figure 1: This diagram shows how each bit in the format byte of a 1-2-3 record is interpreted.

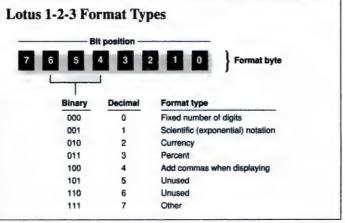


Figure 2: Bits 4 through 6 of the format byte indicate the type of format being used in a 1-2-3 file.

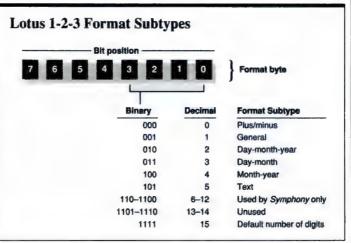


Figure 3: If the format type (shown in Figure 2) is "other," then bits 0 through 3 of the format byte carry the meaning interpreted above.

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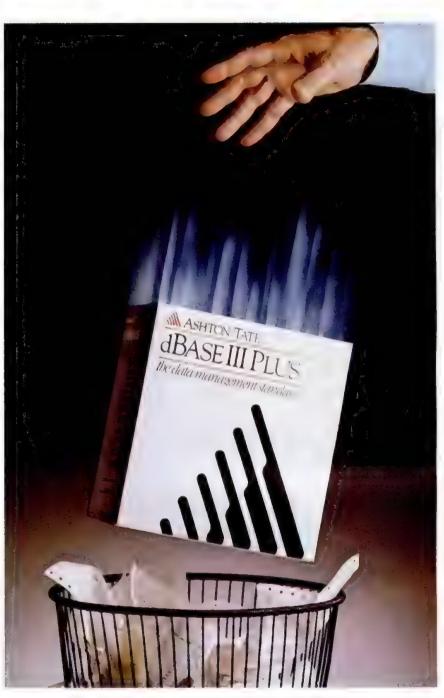
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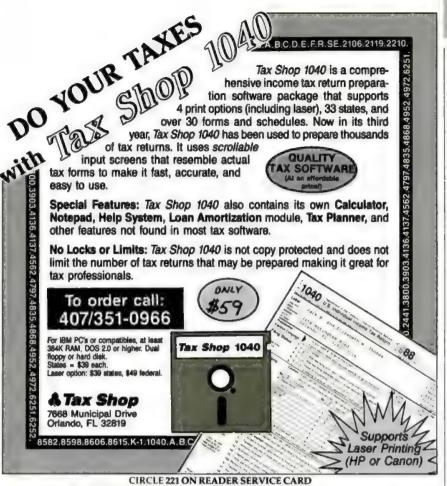
government offices and the storefront down the street.

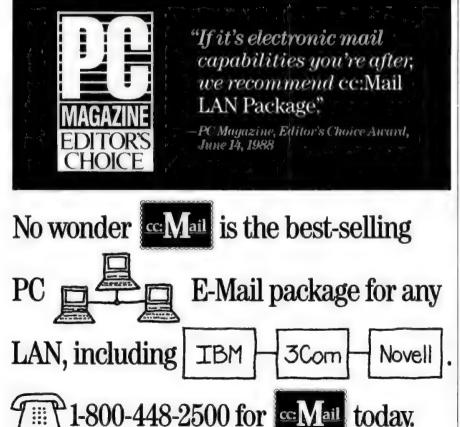
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PC LAB NOTES

or the resulting spreadsheet will have a blank top row and a blank first column.

WRITE123 contains a fourth subprogram that writes the column width information. For each column in a worksheet there must be only one column width record. The WriteColWidth subprogram therefore remembers which columns have already been assigned a width, and will not create a duplicate record.

Now let's look at each of these four subprograms in more detail, beginning with WriteInteger. The first step is to create the integer opcode: 13. Because PUT works only with variables, however, the value is first put into a temporary variable before it is written to the file.

Next, the length will be written, which for an integer is always 7 bytes. Remember, too, that the format, row, and column must be included within the data length if 1-2-3 is to understand it. The format byte is written next. In our sample routine it is set to the default format. That is, the cell is not protected and the display will show only as many digits as necessary.

Finally, the row, column, and integer value that were passed to the subprogram are written to the file. Once all of the necessary data has been written, a call is made to the WriteColWidth subprogram to establish the width of the cell. This last step is optional; if omitted, the cell will default to a width of nine digits. Even though Write ColWidth is called each time a cell is written, it remembers which columns were already processed and ignores subsequent calls for the same column.

The WriteNumber routine is similar to WriteInteger, but an additional format parameter has been added. The coding shown in the subprogram is "homemade," and may be changed to suit your individual needs. Rather than requiring you to deal with the various format types, WriteNumber accepts a control string that indicates the type of format and number of decimal places.

The control string consists of two characters. The first character is a letter indicating a Fixed (F) number of decimal places, the Currency format (C), or the Percent format (P). The second character is a number from 0 to 9, and it establishes the number of decimal places required. Thus the string "F3" will result in a fixed format

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field displaying a number to three decimal places, whereas "C2" would show the number as dollars and cents. If a null string is used or the format is invalid, the default value of 127 will be written.

The WriteColWidth subprogram is not really necessary and may be omitted (though be sure also to remove the statements that call it). If it is included, the column widths will be set to match the field

lengths of the data being written. Thus, when the spreadsheet is loaded by 1-2-3, each field will be displayed in its entirety. Otherwise, the column width would default to nine, which would hide some of the text label contents.

The column width record itself is like all the others in that it has an opcode (8), a length (3), and a data section. The 3-byte data section contains a 2-byte integer for the column number and a 1-byte value for the width. Since this is a single byte, the value is assigned as CHR\$(#) where # is the desired column width.

The last subprogram is WriteLabel, about which there are several points you should know. Labels in 1-2-3 are limited to a maximum of 240 characters; the IF statement shown in the listing checks and adjusts this as necessary. Your application may not require this safeguard, but should you write a label record that is too long, 1-2-3 won't be able to read it and may not be able to read the rest of the file.

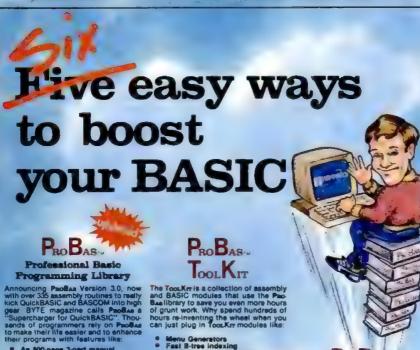
The opcode for a label is 15. The record length is variable and is set to the length of the text string, plus seven. These 7 added bytes include the column and row numbers, the format byte, the CHR\$(39) preceding the text, and the mandatory CHR\$(0) that terminates the string.

The CHR\$(39) is a single quote character, which tells 1-2-3 that the string will be left-aligned in the spreadsheet. You could also use a CHR\$(34) (double quote) or the CHR\$(94) (caret) for right-aligned or centered strings, respectively.

The final record that must be written is the 1-2-3 End of File (EOF) marker. This is the simplest of all records—the opcode is 1, the length is 0, and there is no data section. Depending on what else the program you write may need to do, the file may now be closed with BASIC's CLOSE statement.

With these routines providing the foundation, an astute programmer should be able to manipulate 1-2-3 files in whatever manner needed. You can copy the various sections of code that read and write the spreadsheet data, or use them as the basis for creating subprograms of your own.

Ethan Winer is a contributing editor of PC Magazine. Philip Martin Valley is an industrial engineer for Midas International.



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BYTE · SEPTEMBER 1988

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So, if you're in the market for fax technology and consider your standards as equally exacting, here's what BYTE had to say.

"... Datacopy seems to have a clear idea of the proper role of a fax card."

MicroFax PC Communications is an innovation. Because it is an add-on fax board for the PC which delivers the same capabilities as the most sophisticated stand-alone fax machines with one exception.

Price. You can turn your PC into a fax machine for \$695. A fraction of what more conventional machines cost.

"Easy-to-use menu screens and simple file-conversion procedures make the MicroFax's software stand out." MicroFax is simple to use. You can send and receive documents worldwide at 9600 bits per second no matter what you're doing. Because MicroFax operates unattended. Plus it works simultaneously while other programs are running, so valuable work time is never wasted.

"... MicroFax is compatible with a bost of units."

With MicroFax you can communicate text, graphics and computer files to and from other PCs and fax machines because it also adds a 1200 baud Hayes* compatible ASCII modem to your PC. And to send files between PCs, MicroFax has a 9600 bps file transfer capability.

All of which makes MicroFax the most convenient, economical and smartest solution for the fax needs of any PC owner. Which should measure up to any demanding standards.

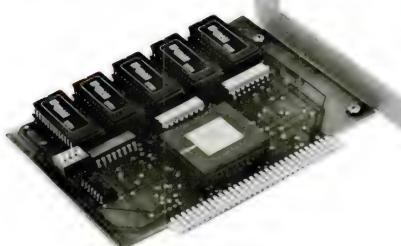
For more information, call Datacopy direct at (800) 821-2898.

MicroFax is a trademark of Datacopy Corporation. All other product names are trademarks or registered trademarks of their respective holders.



CIRCLE 247 ON READER SERVICE CARD

New diskdoubler doubles the storage capacity doubles the storage capacity of your bard disk



for \$189

Upgrade the disk drives in your PC the easy way!

Datran's NEW DiskDoubler dd2000.

The DiskDoubler incorporates the latest in high-speed data compression technology and fits into any available slot on an IBM PC, XT, AT, 286, 386 or compatible, running DOS 2.0 or greater.

Upgrade the capacity of ANY disk drive.

One DiskDoubler board lets you double the storage of ALL disk drives in your PC (including partitioned drives). No matter what size or type of disk drive you have, the DiskDoubler will typically double it. This includes floppies, removable disk drives, Bernoulli Boxes, SCSI, ESDI and RLL drives. Even optical disk drives!

Completely Transparent Operation.

The DiskDoubler is designed specifically for general business applications such as word processing, spreadsheet, and dBase files. It is compatible with most software programs so that once installed you can use your PC as you normally would while DiskDoubler works in the background.

Simple Installation - No cables or connectors.

Installing the DiskDoubler is simple and automatic. It plugs into any available slot and works with your existing hard disk drive and controller.

No Reforming Required.

DiskDoubler does not require that the drive be reformatted. Utilities are provided that can compress all or part of your disk drive without removing the data or modifying your disk drive in any fashion. In fact, DiskDoubler will allow you to configure any logical or physical drive to be either a "compressed" or "uncompressed" drive

Low Power Consumption.

No need to worry about your power supply having enough juice to add another hard disk. The DiskDoubler only needs ½ watt.

Breaks 32MB DOS Barrier.

DiskDoubler doubles the amount of data your disk drive stores so it effectively allows your disk drive to store up to 64MB while staying within the 32MB limitation.

How DiskDoubler Works.

At the heart of the DiskDoubler is a new, powerful, high-speed data compression microprocessor that incorporates Datran's state-of-the-art data compression technology which represents years of research and development. This custom, high-speed data compression chip can process up to 400 million bits per second.

Its performance and speed makes it look as though you added a disk drive of double the capacity to your PC.

Long Life Performance.

3 year limited warranty.

Satisfaction Guaranteed.

30 Day money back guarantee.

System Specifications

System: IBM PC/XT/AT/25/30, 286, or 386 Operating System: DOS 2.0 or greater Memory: 64K memory (TSR) Slot: One short slot (no cables or connectors required

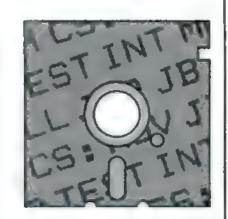




Leadership in Data Compression Technology

Datron Corporation/2505 Foothill Blvd /La Crescenta/CA 91214/Phone (818) 248-8780/FAX (818) 248-8788/Telex 4932115/TurboCom (818) 248-8789

LOG YOUR PC'S ACTIVITY



Automatically track the dates, times, and names of the programs you run to produce an invaluable log with this handy utility, LOG.COM.

If you maintain an office at home and deduct the cost of your hardware and software, the IRS can require you to produce records documenting their use. If you bill by the hour for contract computer work, you need an accurate way of keeping track of on-line time. Or if you manage an office full of PCs, it may be important for you to know just how they're being used.

However, maintaining a handwritten logbook is an intensely annoying chore, especially if computer sessions involve multiple jobs using several different pieces of software. Computers are supposed to remove mindless burdens for the user, not create them.

Just put LOG.COM in your AUTOEX-EC.BAT file, however, and your computer will do its own record keeping. LOG is a compact, memory-resident utility that keeps track of every application program you run, complete with dates, times, and even the command line parameters you used when invoking your programs. Just one glimpse at the ASCII log files LOG generates and there will be no question about how your computer has been spending its time.

The easiest way to get LOG.COM is to download a ready-to-run copy directly from PC MagNet, as explained in the sidebar "LOG by Modem." The LOG.ASM source code is printed here, if you wish to assemble LOG.COM; assembler instructions can be found at the bottom of our DOS-manual-look-alike page. If you don't have a macro assembler or a modem, running the program LOG.BAS (also printed

here) in BASIC will automatically create LOG.COM. Both LOG.ASM and LOG.BAS are also available for downloading from PC MagNet.

USING THE PROGRAM LOG can either be included in your AUTOEXEC .BAT file for automatic loading every time you power up, or you can run it from the DOS command line. The syntax for doing this is

LOG [filespec] [/U]

The optional filespec parameter allows you to select any or all of the parts of a file specification, including the drive, path, and filename. If you omit the parameter entirely, LOG will open a log file named USAGE.LOG in the root directory of your default drive. To use the default USAGE .LOG filename but keep it in the \PCM\TEXT subdirectory of your current drive, for example, you would enter

■ LOG is a compact, memory-resident utility that keeps track of every application program you run, complete with the date and time. LOG \PCM\TEXT\

(Be sure to include the last backslash, to tell LOG that TEXT is a directory, not the name of the log file you want to set up.)

To uninstall LOG once it has been loaded, just run it with the /U parameter. If LOG is the only (or last) TSR program installed, uninstallation will almost always succeed. If it is unable to remove itself from memory, LOG will display the message "Cannot uninstall."

LOG creates plain ASCII files that can be output to your printer or reviewed onscreen using the TYPE command, a browse utility, or a text editor. A log file contains one line of information for every program you run during a session and one line for the "idle" time you spend at the DOS prompt between using programs. LOG does not record the use of internal DOS commands—commands that are not stored as external files on your DOS disk but contained wholly within the operating system-such as DIR, CLS, and TYPE. It does record external DOS commands, such as FORMAT, DISKCOPY, and CHKDSK.

Figure 1 shows a sample log file. Except for LEVEL, the column headings are self-explanatory. The DOS command line level at which you originally invoke LOG is designated level 0. A program that's run from the command line runs at level 1, and when the program terminates, the level returns to 0. Many application programs, such as *WordPerfect* and Quick C, allow you to "shell out" to DOS to perform file-related or other command line activities

UTILITIES

and type EXIT to return to the application. Shelling out of an application involves loading and running a secondary copy of COMMAND.COM, and since the application program is running at level 1, the new copy of COMMAND.COM is run at level 2. When you exit, you return to level 1. Another program run from the level 2 command line runs at level 3, so you can see how easy it is to become nested several levels deep. DOS will allow nesting at as many levels as memory permits. LOG will handle depths of up to 10 levels.

Nesting also occurs when any program loads and runs another, not just when COMMAND.COM is invoked. If you use a DOS shell, for instance, you'll notice that it is loaded at level 1, and other programs are run at level 2 and higher. Shells load and execute application programs directly, without the benefit or hindrance of a command processor.

LOG ignores programs you attempt to run that result in a "Bad command or file name" message from DOS. It also recovers gracefully if its log file is accidentally deleted during the middle of a session. It simply creates a new one, picking up right where it left off in the old one.

HOW LOG WORKS LOG is able to tell which programs you run, because DOS uses function 4Bh of interrupt 21h to load and execute program files. The calling sequence for this function is shown in Figure 2. Function 4Bh—the EXEC function—is one of the most powerful and complex functions DOS provides. When installed, LOG revectors interrupt 21h and monitors every call made to it. If on entry the AX register value is 4B00h, LOG processes the call itself. Otherwise, execution is passed on to the normal interrupt 21h handler.

EXEC expects a subfunction number to be passed in AL. A value of 0 means the program file is to be loaded and executed, while a value of 3 indicates it's to be loaded as an overlay and not executed. LOG keeps track of only those calls that load and run an application. Calls to subfunction 3 are passed on to the operating system.

When LOG intercepts an EXEC call, it records the name of the program file being

DOS Function Call 4Bh (EXEC)

AH 4Bh

DS:DX Pointer to an ASCIIZ string of a filename to be loaded.

ES:BX Pointer to parameter block consisting of more pointers.

O to load and execute the file pointed to by DS:DX.
3 to load program only (used by overlays).

Figure 2: The calling sequence for the DOS EXEC function.

EXECed and the command string passed to it. The DS:DX register pair points to the ASCIIZ program name (an ASCIIZ string is an ASCII string terminated by a null, or zero, byte) while ES:BX points to a parameter block. The parameter block is a table of addresses of pertinent parameters that also contains the address of the command string. The command string (also

		ff Promise				22:88 22:88 22:88	22:68 22:68 22:61	#:##:11 #:##:#2 #:##:42	1	<idle> EXE2BIN.EXE <idle></idle></idle>	log log.com
1 Sep	1988					22:01	22:61	0:60:63	1	HAKEBAS CON	LOG
	END	ELAPSED	LEVEL	********	************	22:81	22:61	#:##:35		<idle></idle>	
PART	=40	PPVLATO	TWART	PROGRAM	PARAMETERS	22:81	22:62	#:##:19	1	EDITOR.EXE	LOG.BAS
1:59	21:59	6:00:00		<idle></idle>		22:82	22:62	#188116		<idle></idle>	
1:59	21:59	0:00:00		NORMAL.COM	/1 /c f	22:82	22183	0:61:00	2	123.EXE	
1:59	21:59	6:00:01	4	<idle></idle>	/4 /G X	22:83	33:83	6:66:63	2	CONSTANTO - COM	
		0:00:06				22:03	22163	8:68:65	3	DDIR.COM	
11:59	21:59		1	INSTALL.COM	ASC	22:63	22193	0:00:03	4	CONHAITD , CON	/CDIR
11:59	21:59	0:00:01		<idle></idle>		22:43	22:43	8:00:00	3	DOXB. COM	
21:59	21:59	6:00:00	7	ABC.COM		22:63	22:03	0.00:62	2	COMMAND . COM	
11:59	22:00	8:88:56		<idle></idle>		22:63	22:63	6:00:06	1	123.EXE	
2:60	22188	4:00:06	1	MARK. BUX	log;	22:03	22164	# : ## : 25	i i	<idle></idle>	
2:00	22:00	4:05:09		<idle></idle>		22:04	22:04	0:00:33	1	TED.COM	autoexec.bat
22:86	22:00	0:00:03	2	LIME.EXE	log;						an opposite to the C

Figure 1: LOG.COM produces a complete record of all your PC activity to satisfy the IRS, client billings, or your own curiosity.

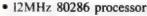
******	****		CHP	AX, 4986H	yexit immediately if this				
; LOG maintains a log of system usage in an ASCII file. Syntax is:			JHE	EXECS	i isn't a call to EXEC				
Log (filespec) [/U]			CHP	CS:[LEVEL].9	regit if we've exceeded				
where filespec - Name of and/or path to log file, /U = Uninstall			318	EXECT	reentrancy limits				
		na ar announce manurary process of a company of the	EXECU: JMP	INT21N	•				
CODE	SEGMENT	PARA PUBLIC 'CODE'	; Save registers passed to EXEC by the parent program.						
	ASSUME	CB:CODE	EXEC1: STI		rinterrupts on				
	ORG	160H	PUSS	AX	;save registers				
REGIN:	JWP	INITIALISE	PUSH	200	,				
			PUSH	CX					
PROGRAN	28	"LOG 1.8 "	PUSH	DX					
COPYRIGHT	DB	"(c) 1988 Eiff Communications Co.".13.18	PUSH	81					
AUTHOR	DM DB	"PC Magazine ",254," Jeff Prosise",13,18,"\$",26	PUSE	DI					
RANDLE	22997	2 Ifile handle	Print	TEP					
DOSVERSION	DW	2 1008 version number	PUSH	DB					
INT21H	DO	; interrupt 21h vector	Push	28					
LEVEL	DW	# IEEEC reentrancy level	; Record the program start/end time and write an entry to the log.						
EXECPLAG	943	8 ;EXEC flag	Pusa	BX	;save registers set for				
XERROR AX	DW	7 jextended error information	PUSH	DE	: EXEC call				
XERROR BX	DW	1	PUSH	DB					
KERROR CK	DM	7	2046	28					
XERROR DE	OW	?	POSE	CB	spoint DG to code segment				
XERROR SI	990	7	POP	DB					
ERROR DI	DW	?	ASSU	E DE:CODE					
XERROR DS	DW	7	XMC	LEVEL.	:increment reentrancy count				
KERROR ES	DW	7	CALL	RECORD TIME	record the current time				
-	DW	3 DUP (#)	VOM	DX, OFFERT FILESPEC	,				
,			CALL	OPERPITAR	gopen the log file				
: DOSINT inte	rcepts cal	ls to interrupt 21h.	MON	SI.LEVEL	spoint SI to start time and				
_			DEC	51	DI to end time				
DOSTWY	PROC	FAR	SIT.	SI.1					
					(LOG.ASM contin				

LOG.ASM: The assembly language source code for LOG.COM, which automatically keeps track of your PC use.

```
SI, OFFSET TIMES
                   ADD
MOV
                                                                                                                         POP
                                                                                                                                   AX
                                                                                                                                   while post-processing is performed. ; then save it for exit
                             DI,SI
                                                                                                      ; -- Save registers again
                   ADD
HOV
DEC
                                                           ; put previous level number
                             AL, BYTE PTR LEVEL
                                                                                                                          PUSE
                                                                                                                                                                 ; save general registers
                                                           in AL
swrite log entry
                             MRITE ENTRY
                   CALL
                                                                                                                          POSE
                                                                                                                                   CE
                                                           joines the log file
jest EXEC flag
                                                                                                                          PUSE
                                                                                                                                   DX
                   CALL
                             CLOSEFILE
                                                                                                                          POSE
                                                                                                                                   BI
                   ARRUME
                             DE: NOTHING
                                                                                                                          PUSE
                                                                                                                                   DI
                                                           restore BHEC register
                                                                                                                          PUSE
                   POP
                             26
                             DØ
                                                              parameters
                                                                                                                          PUSE
                                                                                                                                   DS
                   POP
                             DX
                                                                                                                          PUSH
                   POP
                                                                                                                                   information if DOS version is 3.10 or later.
                                                                                                      1 -- Save extends
                                                                                                                        d error
                             BX
; -- Record the
                  ame of
                           the program just EXECod.
                                                                                                                         PUSE
                                                                                                                                                                 just be to code segment
                   PUBH
                                                           ;save ES and BX for later
                                                                                                                          ASSESSED
                                                                                                                                   DELCODE
                                                                                                                                   DOSVERSION, #38AE
                                                                                                                                                                 jakip if not 3.18 or later
                                                           :net ES equal to DS
                                                                                                                          CHIP
                   PUSH
                             DIF
                                                                                                                          JB
                             ES
                   POP
                   HOV
HOV
                             DI,DX
                                                           jecan for terminating mero
                                                                                                                          PUSE
                                                                                                                                                                  JEAVE DE
                                                                                                                                                                 jest extended error
                                                                                                                                   AE, 59E
                             AL, AL
CX, 128
                                                            : in ASCIIN filename
                                                                                                                          HOV
                                                                                                                                                                    information
                                                                                                                                    218
                   CLD
                                                                                                                          INT
                             SCASS
                                                                                                                                   CS:[XERROR_DS],DS
                                                                                                                                                                  ; save return value of DS
                   REPHE
                                                                                                                          HOV
                                                                                                                                                                  seet DE to code segment sqain
sawa remaining register
values in NERROR array
                             BX, 127
                                                           stransfer string length
                                                                                                                          NOV
                                                                                                                                    XERROR AX.AX
                   BUR
                             BX.CX
                                                           : to CK
                             CX, BX
                   MOV
                                                           ;get ending address in SI
;set SI to last character
                   HOV
                             SI, DI
                                                                                                                          HOV
                                                                                                                                    MERROR CK.CK
                                                                                                                                    XERROR DX.DX
                   SUB
                                                                                                                          MOV
                             81.2
                                                            set DF for reverse string ope
                                                                                                                                    REPROR SI, SI
EXEC2:
                                                            secen beckwards for first
                                                                                                                                    MERROR DI, DI
                   LODGE
                                                                                                                          MOV
                                                               character in filene
                   JE
CHP
                                                                                                                                   tart/end time and write an entry to the log.
                             EXEC3
                                                                                                       :--Record the n
                                                                                                      EXEC7:
                             AL. "
                                                                                                                                   LEVEL
                                                                                                                                                                           ent reentrancy count
                                                                                                                                                                 :decre
                                                                                                                                   RECORD TIME
DX, OFFERT FILESPEC
                   JE
                              EXEC
                                                                                                                          CALL
                                                                                                                                                                  record the current time
                   LOOP
                             EXEC 2
                                                                                                                          MOV
                                                                                                                                                                 ;open the log file
;point SI to start time and
; DI to end time
                   DEC
                             SI
                                                           ;point SI to first character; calculate length of filename; transfer length to CX
                                                                                                                         INC
                             81.2
EXEC3:
                   ADD
                                                                                                                                    SI, LEVEL
                   SUB
                             BX, CX
                                                                                                                                    SI.
                   MOV
                                                                                                                          SHL
SHL
                             CK, BX
                                                           |clear DF again
|set ES to code segment
                                                                                                                                    61.1
                                                                                                                          ADD
                                                                                                                                    SI, OFFSET TIMES
                             CS
                   POP
                             2.5
                                                                                                                                   DI.81
                   MOV
                             AL, 13
                                                           ; calculate offset into table
                                                                                                                          CUB
                             DL, BYTE PTR CS:[LEVEL] ; of program names
                    HOV
                                                                                                                          HOV
                                                                                                                                    AL, BYTE PTR LEVEL
                                                                                                                                                                  ;put previous level number
                                                                                                                                                                 ; in AL
;write log entry
;close the log file
;clear EXEC flag
raion is 3.18 or later.
                                                                                                                          INC
                   MIT.
                             DŒ.
                                                                                                                                    WALTS ENTRY
                             DI OFFET MANEE
                   ADD
                                                                                                                          CALL
                                                                                                                                    CLOSEFILE.
                                                           swrite filename character
                                                                                                                                    EXECPLAG. 8
                   HOV
                             AL, CL
                                                                                                                          HOV
                                                           count into table convert lowercase characters
                                                                                                                                   or information if Dos
                                                                                                         -Restore ext
                   STORE
                                                                                                                                                                 sekip if not 3.18 or later
REECS :
                   LODER
                                                                                                                          CHP
                                                                                                                                   DOSVERSION, $38AH
                                                              to upper and copy filename into table
                                                                                                                                    EXECT
                   CHP
                             AL, "a"
                                                                                                                          338
                                                                                                                                    AX. SDRAH
                             EXEC6
                                                                                                                                                                  prestors information with
                                                                                                                                                                 ; undocumented function 50h
                             AL, "E"
EXEC6
                                                                                                                                   DX, OFFEET MERROR AX
                                                                                                                          2007
                   CHP
                   JA
                                                                                                                                  final time and exit to the parent program.
                   AMD
                                                                                                      :--Restore registere a
                                                                                                                         ASSUNCE
                                                                                                                                   D#: MOTHING
EXECS:
                    STOSE
                                                                                                                                    25
06
                              EXECS
                                                                                                      EXECTI
                                                                                                                                                                 :restore registers
                             ine passed to the program just EXECOD.
                                                                                                                          202
:--Record the
                                                                                                                         POP
POP
POP
POP
POP
POP
                                                                                                                                   BP
DI
                                                           prestore ES and BX
                   POP
                             20
                                                           |load parm string address
                                                                                                                                   81
                   LDS
                             #X.##:[#X+21
                                                                                                                                   CX.
                    HOV
                             CL, [81]
                   XOR
INC
                             CH, CH
                             CX
                                                           ;point ES:D2 to command line
; buffer in code segment
                    PUSH
                             CS
                    POP
                                                                                                      DOSEXIT:
                                                                                                                          TREE
                              DI, OFFSET CONLINE
properties and properties of the parent program.
                                                                                                      DOSINT
                                                                                                        OPENFILE opens an existing log file or creates a new one.
                                                                                                                  DS - code segment
CF: clear-opened/created, set-file could not be opened/created
                   POF
                             DB
                                                                                                      : Exit:
                   POP
                             BP
                             Dİ
                                                                                                      ADDRSPEC
                   POP
                             87
                    POP
                             DX
                                                                                                      CALLFLAG
                                                                                                                          DB
                    POF
                             CX
                                                                                                      OPENFILE
                                                                                                                          PROC
                                                                                                                                   HEAR
                   POF
                             32
                                                                                                                                   DELCODE
                                                                                                                          ASSUNE
                                                                                                                                                                  ;save filmspec address
:-- Save registers again
                             since the DOS 2.X EXEC function destroys them.
                                                                                                                                                                  jattempt to open an existing ; log file ;branch if call failed
                                                                                                                                    AX. 3D62H
                                                                                                                          HOV
                   PUSE
                                                                                                                          TWT
                    PUSE
                             BX
                                                                                                                                    218
                                                                                                                          æ
                                                                                                                                    OPEN3
                    PUSH
                             CX
                                                                                                                          PON
PON
                                                                                                                                    MAMPLE, AN
                    PURE
                             DX
                                                                                                                                                                  satore file handle
                                                                                                                                                                  stransfer it to ax
specition file pointer at
the end of the file
                                                                                                                                    BK, AK
                    PURK
                             81
                             DI
                                                                                                                          100V
200R
                                                                                                                                    AX, 42828
                    PUSE
                    PUGB
                                                                                                                                    CX, CX
                                                                                                                          XOR
INT
                                                                                                                                    DX, DX
                    PUSH
                    PUSH
                                                                                                                                    21E
                                                                                                                                                                 jwrite date to log file
j if this is the first
j call to OPENFILE
                                                                                                                          CO
; -- Save the values of $8 and $9, call EXEC, and restore the stack.
                                                                                                                                   CALLFLAG
                              CS:[HANDLE], BK
                                                           ;calculate an index into
                                                                                                                          INC
                    HOV
                              BX, CS: [LEVEL]
                                                            ; the STACESES and
                                                                                                                                                                  then write header line
                                                                                                                         CALL
                                                                                                                                   WRITE MEADER
                              BX,1
                                                                                                                          CLC
                                                                    ; disable interrupts and ; save the 88 and 89 ; registers
                                                                                                      OPEN1:
                    CLI
                                                                                                      OPEN2:
                    HOV
                              WORD PTR CB:[STACKSEG][BX], 85
                                                                                                                         an existing file failed. Create a new one and initialize it.

HOV AH, JCE : jattempt to create a new
                    HOV
                              WORD PTR CS:[STACEPTR][BX], SP
                                                                                                      ; -- Call to open
                                                                                                                                                                 jattempt to create a new
; file of the same name
                                                                                                      OPENS:
                    HOW
                              BX, CE: [RANDLE]
                    PURKE
                                                                                                                          HOR
                                                                                                                                    CX, CX
                                                            ; POSM the flage register and
                                                            ; call DOS EXEC
;store flage temporarily in AH
;recalculate table index
                                                                                                                          HOV
                                                                                                                                    DX.ADDREPEC
                    CALL
                             THE 21st
                    LABS
                                                                                                                          INT
                                                                                                                                    218
                    MOV
                                                                                                                          JC
MOV
                                                                                                                                    OPEN2
BANDLE, AX
                                                                                                                                                                  ;exit on error
                              BX, CB:[LEVEL]
                                                                                                                                    BX, AX
CALLFLAG, 1
                                                                                                                          HOV
                              BE, 1
                    SIL
                                                                                                                                                                  stransfer it to BX
                                                                    ;disable interrupts and ; restore SS and SP
                                                                                                                                                                  ;set entry flag
;write copyright text
                    CLI
                    HOV
                                                                                                                          HOV
                              SE, WORD PTR CS:[STACKSEG][BX]
                                                                                                                                    AE, 40H
                    HOV
                              SP, WORD PTR CS: [STACKPTR][BE]
                                                                                                                                    CE, 78
                                                                                                                                    DE, OFFSET PROGRAM
                    STI
                                                                                                                          MOV
                                                            prestore flags
; -- Restore the
                  registers to their conditions before EXEC was called.
                                                                                                                                    OPENS
                                                                                                                                                                  perit
                                                                                                      OPEMPILE
                             D6
37
                    POP
                                                                                                       CLOSEFILE closes the log file.
                    POP
                    POP
POP
                                                                                                      CLOSEFILE
                             SI
DX
                                                                                                                          PROC
                                                                                                                                   MEAR
                             CX
                                                                                                                                   AR, 3EH
                                                                                                                                                                               (LOG ASM continues)
```

A lot of computer for your money... plus a one-year warranty!



- 0 Wait States
- 1MB RAM
- 1.2MB floppy drive
- Dual floppy/hard drive controller
- 200-watt power supply
- Keyboard.



Bentley-286/12

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Color Combo



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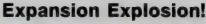


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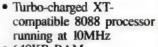
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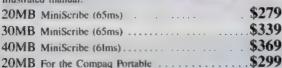
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FORMWORX lets you create any form in-stantly. Using FORMWORX'S advanced drawing tools, you can draw vertical and horizontal lines, boxes with dots, dashes or solid lines of various widths...add heading and text using a variety of type sizes and styles...and complete your form by adding any of 95 graphics fill patterns including shading and borders. FORMWORX outperforms all of the competition.

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The MICROBIZ RETAIL STORE SYSTEM is an extraordinary system for managing all retail store sales, customers and inventory. Quickly bill your customers, keep track of your inventory, commissions, look up prices, print cash register receipts (or complete invoices) and perform all the day-to-day functions required to keep you on top of your business and its cash flow. It's time to

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UTILITIES

CLOSEFILE	INT RET RHDP	3X, HANDLE 21E			MOV MOV	WRITE NUM AH, 46H BK, HANDLE CK, 1	;write ":" to separate ; hours and minutes
WRITE ENTRY Entry: DS	writes a	one-line entry to the ort time	log file.		IMI IMI MOU	DX, OFFSET COLOR 21R AL, [SI]	;write minutes to log file
AI		it reentrancy level			CALL	NE, RE WRITE NUM	•
ASTLEVEL	DB	?		WRITE TIME	RET	-	
RITE ENTRY	PROC	HEAR		1	writes the	e elapsed time to the l	or file
-	ASSUME	DS:COOR LASTLEVEL, AL	store last level number	; Entry: D	S:SI - st	art time, DS:DI - end	tine
	CALL	WRITE_TIME	;write start time	DELTA	Dis	3 DUP (?)	
	CALL	WRITE_SPACES		WRITE_DIFF	PROC	HEAR	
	NOV	SI,DI	; wave start time ; write end time		NOV	DS:CODE AL,[DI]	retrieve starting and endin
	HOV	WRITE_TIME CX,3			360V 360V	%L, (%I) CL, [DI+1]	; seconds, minutes, and : hours
	POP	WRITE_SPACES	pretrieve start time		YOM	DL,[SI+1] AR,[DI+2]	
	HOV	WRITE_DIFF CX.5	;write elapsed time		HOV	NH, [SI+2] AH, NH	old anding assesses to ter-
	CALL	WRITE SPACES	;write reentrancy level		JAE	WRDIPP1	jif ending seconds is less ; than starting, add 68 to
	HOV	BL,1	intito tenteration feret		DEC	AH, 66 AL	; ending seconds and ; decrement ending minutes
	MOV	CK, 6		WRDIFF1:	JGE	AL, BL WRDIFF2	; if ending minutes is less; then starting, add 68 to
	HOV	WRITE SPACES	calculate offset into		ADD	AL, 68	; ending minutes and ; decrement ending hours
	HOV	LASTLEVEL DX.AX	; program name table	WRDIFF2:	JGE	CL,DL WRDIFF3	; if ending hours is less; then starting, add 24
	ADD	DK, OFFSET MAMES	;write program name	WRDIFF3:	ADD	CL,24	; to ending hours
	HOV	BK,DX	, at a to progress many	WHO I FE 3:	NOV	AH, BR DELTA+2, AH	;calculate seconds difference;store it
	HOV KOR	CL, [BX] CH, CH			NOV	AL, BL DELTA, AL	;calculate minutes difference; store it
	PUSH	CX BK, HANDLE			MOV	CL,DL DELTA+1,CL	;calculate hours difference
	INC	DX 21H		1	MOV	SI, OFFSET DELTA WRITE TIME	;write hours and minutes to ; the log file
	POP	BX EXECFLAG. #	soule now if this onter is		MOV	AH, 40H	;write ":" to log file
	JE	NOPARHS	; exit now if this entry is ; a return from EXEC	1	HOV	BX, HANDLE CX, 1	
	HOV EUB	CK,12 CK,BK	calculate number of spaces to skip		INI	DX, OFFSET COLOR	
	CALL	CX,5 WRITE SPACES			XOR	AL,[SI+2] BL,BL	;write seconds to log file
	MOV	BX, OFFSET COMLINE CL, [BX]	; write command line passed ; to the last program		CALL	WRITE NUM	
	XOR	CH, CH MOPARMS	EXECTd to the log file	WRITE_DIFF	ENDP		
	JCX8 HOV	AB, 49H		: WRITE NUM C	onverts a	binary byte value to a	SCII and writes it to the log
	HOV	BX, MANDLE DX, OFFSET COMLINE+1		; file. Valu ; Entry: AL	 byte val 	between # and 99, incl ive, BL - # = include l	usive. eading seroes, 1 = don't include
IOPARMS:	CALL	21H WRITE CRLP	end line with CR/LF	FILEWORD	DW	2	***************************************
	RET	_	,			•	
RITE ENTRY	ENDP			MRITE MUN	PRÓC	MEAR	
			~	MULTE_HUN	PROC ASSUME	MEAR DB:CODE	CORNEY to BOR in by
WRITE DATE W	rites the	current date to the le	og file.	MRXTE_HUH	ASSUNE AAN OGA	DB:CODE AX,3835H	;convert to BCD in AX ;convert to ASCII
WRITE DATE W	rites the	current date to the le	og file.	MUTE_HUN	ASSUME AAH ADD OR JS	DS:CODE AX,3838H BL,BL WRNUML	convert to ASCII convert leading zero to space if BL = 1 on
WRITE DATE W	DB DB PROC	"JanFebNarAprNayJunJu "19" WEAR	og file.	MUTE_HUN	ASSUME AAN ADD OR JS CMP JME	D8:CODE AX,3835H BL,BL WRNUHE AH,38H WRNUHI	convert to ASCII convert leading zero to
WRITE DATE W	DB DB PROC	"JanFebNarAprNayJunJu "19"	og file.	MUTE_HUN	ASSURE AAM ADD OR JS CMP	D8:CODE AX,3838H BL,BL WRBUUE AH,38H	convert to ASCII convert leading zero to space if BL = 1 on
WRITE DATE W	DS DB PROC ASSUME	"JanFebNarAprNayJunJu! "19" "EAR DE:CODE WRITE CRLF AH, 2AH	og file. lAugSepOctNovDec*		ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV	DS:CODE AX,3838H BL,BL WRNUME AH,38H WRNUMI AH,28H AH,28H AH,AL FILEWORD,AX	convert to ASCII convert leading zero to apace if BL = 1 on annual entry swap bytes attors them
WRITE DATE W	PROC ASSUME CALL HOVE	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE WRITE CRLP AH, 2AH 21E CX	og file. lAugSepOctHowDec* ;skip one line		ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV MOV MOV	D8:CODE AX,3835H BL,BL WRNUMI AH,38H WRNUMI AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE	convert to ASCII convert leading zero to apace if BL = 1 on entry swap bytes
WRITE DATE W	PROC ASSUME CALL MOVINT PUSH NOV	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE WRITE CRLF AH, 2AH 21B CX DX AL,DL	pog file. lAugsepOctNowDec* pakip one line pget date from DOS pave it pwrite day of the month to		ABBURE AAM ADD OR JS CNP JNE HOV XCHG HOV HOV HOV HOV HOV	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD	;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the
WRITE DATE W	PROC ASSUME CALL HOV INT PUSH PUSH MOV XOR CALL	GUTTENT date to the 1st of the 1s	page file. laugsepoctNovDec" pakip one line pet date from DOS pave it pwrite day of the month to the log file	MERITUM 1 :	ASSUME AAM ADD OR JS CNP JWE HOV XCHG HOV HOV HOV HOV HOV HOV INT RET	DS:CODE AX,3835H BL,BL MRHUMI AH,38H WRHUMI AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2	;convert to ASCII ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the
WRITE DATE W	PROC ASSUME CALL MOV INT PUSE PUSE PUSE PUSE PUSE PUSE PUSE PUSE	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DB:CODE WRITE CRLF AH, 2AR 21B CX DX AL,DL BL,BL	pog file. lAugsepOctNowDec* pakip one line pget date from DOS pave it pwrite day of the month to	WRITE_NUM	ASSUME AAM ADD OR JS CMP JNE MOV XCHG MOV HOV HOV HOV HOV INT RET EMDP	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,28H AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H	convert to ASCIT convert leading zero to page if BL = 1 on entry swap bytes store them then write them to the log file
WRITE DATE W	PROC ASSUME CALL HOV INT PUSH HOV KOR CALL HOV	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE WRITE_CRLP AH, 2AR 21R CX DX AL,DL BL,BL WRITE_NUM CX,1	pog file. AugsepOctNovDec"	WRITE_NUM ; WRITE READE	ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV MOV MOV MOV MOV INT RET EUDP	D8:CODE AX,3838H BL,BL WRNUM! AH,38H WRNUM! AH,28H AB,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to the	convert to ASCII convert leading zero to space if BL = 1 on sentry swap bytes store them then write them to the log file
WRITE DATE W	PROC ASSUME CALL HOV INT PUSH HOV CALL POP DEC HOV	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE WRITE CRLF AH, 2AR 21B CX DX AL,DL BL,BL WRITE NUM CX,1 WRITE SPACES DX DR CL,DH	pog file. AugSepOctNovDec" pakip one line pet date from DOS pave it pwrite day of the month to the log file pakip a space petrieve month from stack pealculate offset into NONTH table of text for the	WRITE_NUM ; WRITE READE	ASSUME AAM ADD OR JS CNP JNE HOV XCHG HOV HOV HOV HOV HOV HOV ENT RET ENDP R Writes t	DS:CODE AX,3838H BL,BL MRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to the "START",5 DUF (32),"E	convert to ASCII convert leading zero to page if BL = 1 on entry swap bytes store them then write them to the log file log file. MD*,5 DUP (32)
WRITE DATE W	PROC ASSUME CALL HOV INT PUSH HOV XOR CALL POP DEC HOV XOR HOV	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21H CX DX AL,DL BL,BL WRITE NUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET MONTHS	;skip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH	WRITE_NUM ; WRITE_READE ;	ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV MOV MOV MOV MOV MOV SET EMDP Ret DB DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32),"FROGRAM",18 DUF (32),	convert to ASCII convert leading zero to sepace if BL = 1 on entry swap bytes store them then write them to the log file MD*,5 DUP (32) "LEVEL",4 DUP (32)
WRITE DATE WONTHS ENTURY	PROCASSUME CALL HOV INT PUSH HOV KOR CALL HOV CALL HOV CALL HOV CALL POP DEC HOV XOR HOV XOR	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE WRITE_CRLF AH, 2AR 21B CX DX AL,DL BL,BL WRITE_NUM CX,1 WRITE_NUM CX,1 WRITE_SPACES DX DR CL,DH CR,CH DX,OFFSET HONTES MRDATE2 DX,3	pog file. AugSepOctNovDec" pakip one line pet date from DOS pave it pwrite day of the month to the log file pakip a space petrieve month from stack pealculate offset into NONTH table of text for the	WRITE_NUN ; WRITE_HEADE ; TITLES EQUALSIGN	ASSUME AAM ADD OR JS CMP JNE HOV XCHG HOV HOV HOV HOV HOV HOV ENT RET ENDP R Writes t	DS:CODE AX,3838H BL,BL MRHUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to the "START",5 DUF (32),"E "ELAPSED",4 DUF (32), "PROGRAM",18 DUF (32)	convert to ASCII convert leading zero to sepace if BL = 1 on entry swap bytes store them then write them to the log file MD*,5 DUP (32) "LEVEL",4 DUP (32)
WRITE DATE W CONTRS ENTURY FRITE DATE	PROC ASSUME CALL MOV INT PUSH MOV KOR CALL MOV CALL POP DEC MOV XOR MOV JCKZ	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AR 21B CX DX AL,DL BL,BL WRITE HUN CX,1 WRITE SPACES DX DR CL,DH CR,CH DX,OFFSET HOWTHS WRDATE2	pog file. AugSepOctNovDec" pakip one line pet date from DOS pave it pwrite day of the month to the log file pakip a space petrieve month from stack pealculate offset into NONTH table of text for the	WRITE_NUM ; WRITE_READE ;	ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV MOV MOV MOV MOV MOV SET EMDP Ret DB DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32),"FROGRAM",18 DUF (32),	;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file e log file. MD*,5 DUP (32) **LEVEL*,4 DUP (32)
WRITE DATE WONTRS ENTURY RITE DATE	PROC ASSUME CALL HOV INT PUSH HOV XOR CALL POP DEC HOV XOR HOV JCRZ ADD LOOP	GUTTENT date to the 1d "JanfebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AR 21B CX DX AL,DL BL,BL WRITE HUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET HOWTHS WRDATE2 DX,3 WRDATE1 AH,468 BX,RANDLE	;skip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;ekip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month	WRITE_NUN ; WRITE_HEADE ; TITLES EQUALSIGN	ASSUME AAM ADD OR JS CMP JWE MOV XCHG MOV MOV MOV MOV MOV MOV INT RET EMDP R Writes t DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,28H AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32), "FROGRAM",18 DUF (32) """ MEAR D8:CODE AH,48H	convert to ASCII convert leading zero to sepace if BL = 1 on entry swap bytes store them then write them to the log file MD*,5 DUP (32) "LEVEL",4 DUP (32)
WRITE DATE WONTRS ENTURY RITE DATE	PROCASSUME CALL HOV INT PUSH HOV XOR CALL HOV XOR CALL HOV XOR HOV XOR HOV XOR HOV JCXZ ADD LOOP HOV HOV INT	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE_NUM CX,1 WRITE_NUM CX,1 WRITE_SPACES DX DH CL,DH CB,CH DX,OFFSET MONTRS WRDATE1 AH,46B BX,HANDLE CX,3 21B	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into MONTH ; table of text for the ; current month	WRITE_NUN ; WRITE_HEADE ; TITLES EQUALSIGN	ASSUME AAM ADD OR JS CMP JNE HOV XCHG MOV MOV MOV MOV MOV MOV INT RET EIDP R Writes to DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E" "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AH,48H BX,HANDLE CX,67	convert to ASCII convert leading zero to spece if BL = 1 on entry swap bytes store them then write them to the log file log file mb^,5 DUP (32) "LEVEL",4 DUP (32) "PARAMETERS",13,16
WRITE DATE WONTRS ENTURY RITE DATE	PROC ASSUME CALL HOV INT PUSH HOV XOR CALL POP DEC HOV XOR HOV JCKE ADD LOOP HOV HOV INT HOV CALL	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AR 21B CX DX AL,DL BL,BL WRITE HUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET MONTHS WRDATE2 DX,3 WRDATE1 AH,46E BX,HANDLE CX,3 21B CX,1 WRITE SPACES	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into MONTH ; table of text for the ; current month ;write month to log file ;skip a space	WRITE_NUN ; WRITE_HEADE ; TITLES EQUALSIGN	ASSUME AAM ADD OR JS CMP JWE MOV KCHG MOV MOV MOV MOV MOV MOV INT RET EMDP R Writes t DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AB,AL FILEWORD,AX AB,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H the column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32), "FROGRAM",18 DUF (32) """ MEAR D8:CODE AH,48H BX,HARDLE CX,67 DX,OFFSET TITLES 21E	convert to ASCII convert leading zero to space if BL = 1 on entry swap bytes store them then write them to the log file alog file MD-,5 DUP (32) LEVEL*,4 DUP (32) PARAMPTERS*,13,15
WRITE DATE WOMTHS ENTURY RITE DATE	PROCASSUME CALL HOV INT PUSE PUSE HOV XOR CALL HOV XOR CALL HOV XOR HOV XOR HOV XOR HOV JCRZ ADD LOOP HOV HOV INT HOV CALL HOV	GUTTENT date to the 10 "JanFebNerAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE_NUM CX,1 WRITE_NUM CX,1 WRITE_SPACES DX DH CB,CH DX,OFFSET MONTHS WRDATE2 DX,3 WRDATE1 AH,46B BX,HANDLE CX,3 21B CX,1 WRITE_SPACES AH,46B CX,2 CX,2 AH,46B CX,2 CX,2 CX,2 CX,3 CX,1 WRITE_SPACES AH,46B CX,2	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into MONTH ; table of text for the ; current month	WRITE_NUN ; WRITE_HEADE ; TITLES EQUALSIGN	ASSUME AAM ADD OR JS CMP JNE MOV XCHG MOV MOV MOV MOV MOV MOV INT RET EMDP R Writes t DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32), "PROGRAM",18 DUF (32) "" MEAR D8:CODE AH,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX	convert to ASCII convert leading zero to spece if BL = 1 on entry swap bytes store them then write them to the log file log file mb^,5 DUP (32) "LEVEL",4 DUP (32) "PARAMETERS",13,16
WRITE DATE WOMTHS ENTURY RITE DATE	PROCASSUME CALL HOV INT PUSS HOV KOR CALL HOV CALL HOV CALL HOV KOR CALL HOV KOR CALL HOV CALL HOV KOR HOV KOR HOV KOR HOV KOR HOV KOR HOV KOR	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DE:CODE WRITE CRLF AH, 2AH 21H CX AL,DL BL,BL WRITE NUM CX,1 WRITE_SPACES DX DH CCL,DH CB,CH DX,OFFSET MONTHS MRDATE1 AH,45H BX,RANDLE CX,3 21H CX,1 WRITE SPACES AH,45H	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into MONTH ; table of text for the ; current month ;write month to log file ;skip a space	WRITE_NUM ; WRITE_HEADE ; TITLES EQUALSIGN WRITE_HEADER	ASSUME AAM ADD OR JS CMP JNE HOV XCHG HOV	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AH,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX AH,48H	convert to ASCII convert leading zero to space if BL = 1 on entry swap bytes store them then write them to the log file alog file MD-,5 DUP (32) LEVEL*,4 DUP (32) PARAMPTERS*,13,15
WRITE DATE WOMTHS ENTURY RITE DATE RDATE1:	PROC ASSUME CALL HOV INT PUSH HOV XOR HOV JCKE ADD LOOP HOV HOV INT POP CALL HOV INT POP CALL HOV INT HOV INT HOV INT POP	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21R CX DX AL,DL BL,BL WRITE NUM CX,1 WRITE NUM CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET MONTHS WRDATE1 AH,45E BX,HANDLE CX,3 21E CX,1 WRITE SPACES AH,45E CX,2 DX,OFFSET CENTURY 21H CX	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into NONTH ; table of text for the ; current month ; write month to log file ; skip a space ; write "19" portion of year	WRITE_NUM ; WRITE_HEADE ; TITLES EQUALSIGN WRITE_HEADER	ASSUME AAM ADD OR JS CMP JHE HOV XCHG HOV	D8:CODE AX,3838H BL,BL WRNUW1 AH,38H WRNUW1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to the "START",5 DUP (32),"E "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AH,46H BX,RANDLE CX,67 DX,OFFSET TITLES 21E CX,79 CX AH,48E CX,1 DX,OFFSET EQUALSIGN	convert to ASCII convert leading zero to space if BL = 1 on entry swap bytes store them then write them to the log file alog file MD-,5 DUP (32) LEVEL*,4 DUP (32) PARAMPTERS*,13,15
WRITE DATE WONTRS ENTURY RITE DATE	PROCASSUME CALL MOVINT PUSH PUSH MOVIOR CALL MOV CALL MOV CALL POP DEC MOV XOR MOV JCK2 ADD LOOP MOV MOV INT MOV CALL HOV MOV INT POP SUB NOV	GUTTENT date to the 10 "JanFebNerAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE NUN CX,1 WRITE SPACES DX DR CL,DH CE,CH DX,OFFSET HONTES MRDATE2 DX,3 MRDATE1 AH,46B BX,RANDLE CX,3 21B CX,1 WRITE SPACES AH,46B CX,2 DX,OFFSET CENTURY 21H CX CX,1986 AL,CL	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month ;write month to log file ;skip a space ;write "19" portion of year	WRITE_NUM ; WRITE_HEADE ; TITLES EQUALSIGN WRITE_HEADER	ASSUME AAM ADD OR JS CMP JHE MOV MOV MOV MOV MOV MOV MOV INT RET EMDP R Writes to DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AH,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX AH,48H CX,1 DX,OFFSET EQUALSIGN 21H CE	;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file e log file. MD*,5 DUP (32) *LEVEL*,4 DUP (32) ,*PARAMETERS*,13,15 ;write column titles
WRITE DATE WOMTHS ENTURY RITE DATE	PROC ASSUME CALL HOV INT PUSH HOV XOR HOV JCKE ADD LOOP HOV HOV INT POP BUS NOV XOR CALL HOV CALL CALL CALL CALL CALL CALL CALL CAL	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21R CX DX AL,DL BL,BL WRITE NUM CX,1 WRITE NUM CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET MONTHS WRDATE1 AH,45E BX,HANDLE CX,3 21E CX,1 WRITE SPACES AH,45E CX,2 DX,OFFSET CENTURY 21H CX CX,1966 AL,CL BL,BL WRITE NUM	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into NONTH ; table of text for the ; current month ; write month to log file ; skip a space ; write "19" portion of year ; retrieve year from stack ; aubtract century portion ; write year to the log file	WRITE_NUM ; WRITE_HEADE ; TITLES EQUALSIGN WRITE_HEADER	ASSUME AAM ADD OR JS CMP JHE HOV XCHG HOV	D8:CODE AX,3838H BL,BL WRDUM1 AH,38H WRNUM1 AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) "=" MEAR D8:CODE AH,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX AB,48E CX,1 DX,OFFSET EQUALSIGN 21H	;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file e log file. MD*,5 DUP (32) *LEVEL*,4 DUP (32) ,*PARAMETERS*,13,15 ;write column titles
WRITE DATE WONTRS ENTURY RITE DATE	PROC ASSUME CALL MOV INT PUSH MOV XOR MOV JCXE ADD LOOP MOV MOV INT MOV CALL HOV HOV HOV HOV HOV HOV HOV HOV HOV KOR	GUTTENT date to the 10 "JanFebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21H CX AL,DL BL,BL WRITE NUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET HONTRS MRDATE2 DX,3 MRDATE1 AH,46H BX,HANDLE CX,3 21H CX,1 WRITE SPACES AH,46H CX,2 DX,0FFSET CENTURY 21H CX CX,1966 AL,CL BL,BL	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into NONTH ; table of text for the ; current month ; write month to log file ; skip a space ; write "19" portion of year ; retrieve year from stack ; subtract century portion	WRITE NUM ; WRITE HEADE TITLES EQUALSIGN WRITE HEADER WRITE HEADER	ASSUME AAM ADD OR JS CMP JNE MOV JS CMP JNE MOV	DS:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H CX 2 DX,OFFSET FILEWORD 21H CX 3 DY, CFFSET FILEWORD 21H CX 67 DX,OFFSET TITLES 21E CX,79 CX AH,48H CX,1 DX,OFFSET EQUALSIGN 21H CZ WRHEAD1 WRITZ CRLP	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file e log file. MD*,5 DUP (32) *LEVEL*,4 DUP (32) ,*PARAMETERS*,13,16 ;write column titles ;write row of *=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE WONTRS ENTURY RITE DATE	PROCASSUME CALL HOV INT PUSE PUSE HOV XOR CALL HOV XOR CALL HOV XOR HOV XOR HOV XOR HOV JCXZ ADD LOOP HOV HOV INT HOV INT POP SUB NOV XOR CALL CALL CALL COP CALL CALL COP CALL CALL COP CALL CALL CALL CALL CALL CALL CALL CAL	GUTTENT date to the 10 "JanFebNerAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE_NUM CX,1 WRITE_SPACES DX DH CCL,DH CCB,CH DX,OFFSET MONTHS WRDATE1 AH, 46B BX, HANDLE CX,1 WRITE_SPACES AH, 46B CX,1 WRITE_SPACES AH, 46B CX,2 DX,0FFSET CENTURT 21H CX CX,1966 AL,CL BL,BL MRITE_CRLF	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into NONTH ; table of text for the ; current month ; write month to log file ; skip a space ; write "19" portion of year ; retrieve year from stack ; aubtract century portion ; write year to the log file	WRITE_NUM ; WRITE_HEADE ; TITLES EQUALSIGN WRITE_HEADER WRITE_HEADER	ASSUME AAM ADD OR JS CMP JNE MOV XCHG MOV	DS:CODE AX,3838H BL,BL WRNUW1 AH,39H WRNUW1 AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H TSTART",5 DUF (32),"E"ELAPSED",4 DUF (32),"FROGRAM",18 DUF (32),"FROGRAM",18 DUF (32),"E"ELAPSED",4 DUF (32),"E"ELAPSED",4 DUF (32),"E"ELAPSED ELAPSED ELA	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file. MD*,5 DUP (32) *LEVEL*,4 DUP (32) *LEVEL*,4 DUP (32) ,*PARAMETERS*,13,16 ;write column titles ;write row of *=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE WOMTHS ENTURY RITE DATE RDATE1: RDATE2:	PROC ASSUME CALL HOV INT PUSH HOV XOR HOV XOR HOV JCXZ ADD LOOP HOV HOV INT POP SUB NOV CALL HOV HOV INT POP SUB NOV XOR CALL CALL RET ENDP	GUTTENT date to the 10 "JanfebNerAprNayJunJu! "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE NUM CX,1 WRITE SPACES DX DH CB,CH DX,OFFSET MONTHS WRDATE1 AH, 46B BX, HANDLE CX,3 21B CX,1 WRITE SPACES AL,4B CX,2 DX,0FFSET CENTURT 21H CX CX,1966 AL,CL BL,BL MRITE CRLF WRITE CRLF	; skip one line ; get date from DOS ; save it ; write day of the month to ; the log file ; skip a space ; retrieve month from stack ; calculate offset into NONTH ; table of text for the ; current month ; write month to log file ; skip a space ; write "19" portion of year ; retrieve year from stack ; aubtract century portion ; write year to the log file ; finish with CRLF pairs	WRITE NUM ; WRITE HEADE TITLES EQUALSIGN WRITE HEADER WRITE HEADER WRITE CRLF	ASSUME AAM ADD OR JS CMP JNE MOV XCHG MOV MOV MOV MOV MOV MOV INT RET ENDP R Writes t DB	D8:CODE AX,3838H BL,BL WRDUM1 AH,38H WRNUM1 AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E" "ELAPSED",4 DUP (32),"FROGRAM",18 DUP (32) """ MEAR D8:CODE AH,48H BX,EARDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX AB,48H CX,79 CX AB,48H CX,11 DX,OFFSET EQUALSIGN 21H CE WRHEAD1 WRITE CRLF	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file MD*,5 DUP (32) "LEVEL",4 DUP (32) ,"PARAMETERS*,13,16 ;write column titles ;write row of "=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE WONTRS ENTURY RITE DATE RDATE1: RDATE2: WRITE TIME W	PROC ASSUME CALL HOV INT PUSH HOV XOR HOV JCKE ADD LOOP HOV HOV INT POP SUB MOV KOR CALL HOV HOV INT POP SUB MOV KOR CALL HOV HOV INT POP SUB MOV KOR CALL CALL CALL CALL CALL CALL CALL CAL	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21H CX DX AL,DL BL,BL WRITE NUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET HONTRS MRDATE2 DX,3 MRDATE1 AH,46B BX,HANDLE CX,3 21H CX,1 WRITE SPACES AH,46H CX,2 DX,0FFSET CENTURY 21H CX CX,1966 AL,CL BL,BL MRITE CRLF WRITE CRLF WRITE CRLF	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month ;write month to log file ;skip a space ;write "19" portion of year ;retrieve year from stack ;aubtract century portion ;write year to the log file ;finish with CRLF pairs	WRITE_NUM ; WRITE_NUM ; WRITE_HEADE TITLES EQUALSIGN WRITE_HEADER WRITE_HEADER WRITE_CRLF ; WRITE_CRLF ; CRLF	ASSUME AAM ADD OR JS CMP JHE MOV MOV MOV MOV MOV MOV MOV MOV INT RET ENDP R Writes t DB	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E "ELAPSED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AH,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21E CX,79 CR AH,48H CX,1 DX,OFFSET EQUALSIGN 21H CE WRHEAD1 WRITZ CRLP CATTIAGO FETURE / line 13,18	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file MD*,5 DUP (32) "LEVEL",4 DUP (32) ,"PARAMETERS*,13,16 ;write column titles ;write row of "=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE W CONTRS ENTURY FRITE DATE FRDATE1: FRDATE2: WRITE DATE WRITE TIME W	PROC ASSUME CALL HOV INT PUSH HOV XOR HOV JCKE ADD LOOP HOV HOV INT POP SUB MOV KOR CALL HOV HOV INT POP SUB MOV KOR CALL HOV HOV INT POP SUB MOV KOR CALL CALL CALL CALL CALL CALL CALL CAL	GUTTENT date to the 10 "JanfebNarAprNayJunJu! "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21H CX DX AL,DL BL,BL WRITE NUN CX,1 WRITE SPACES DX DR CL,DH CB,CH DX,OFFSET HONTRS MRDATE2 DX,3 MRDATE1 AH,46B BX,HANDLE CX,3 21H CX,1 WRITE SPACES AH,46H CX,2 DX,0FFSET CENTURY 21H CX CX,1966 AL,CL BL,BL MRITE CRLF WRITE CRLF WRITE CRLF	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month ;write month to log file ;skip a space ;write "19" portion of year ;retrieve year from stack ;aubtract century portion ;write year to the log file ;finish with CRLF pairs	WRITE NUM ; WRITE HEADE TITLES EQUALSIGN WRITE HEADER WRITE HEADER WRITE CRLF	ASSUME AAM ADD OR JS CMP JHE HOV XCHG MOV MOV MOV MOV MOV MOV INT RET EHDP R Writes t DB	DS:CODE AX,3838H BL,BL WRDUM1 AH,38H WRNUM1 AH,29H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E" "ELAPSED",4 DUP (32),"PROGRAM",18 DUP (32) """ MEAR DS:CODE AH,48H BX,RAMDLE CX,67 DX,OFFSET TITLES 21H CX,79 CX AB,48E CX,79 CX AB,48E CX,1 DX,OFFSET EQUALSIGN 21H CE WRHEAD1 WRITE CRLF CETTIAGG FETURY / line 13,18 MEAR DB:CODE	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file. MD*,5 DUP (32) "LEVEL",4 DUP (32) ,"PARAKETERS",13,16 ;write column titles ;write row of "=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE W CONTHS ENTURY FRITE DATE FROATE1: FROATE2: WRITE TIME W COLON	PROC ASSUME CALL HOV INT PUSH HOV XOR CALL HOV XOR HOV XOR HOV HOV HOV INT HOV CALL HOV HOV CALL HOV CALL HOV HOV CALL HOV HOV KOR CALL HOV HOV KOR CALL CALL CALL CALL CALL CALL CALL CAL	GUTTENT date to the 10 "JanfebNarAprNayJunJu!" "19" WEAR DS:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE NUM CX,1 WRITE SPACES DX DH CL,DH CB,CH DX,OFFSET MONTHS WRDATE1 AH,46B BX,HANDLE CX,3 21B CX,1 WRITE SPACES AL,CL BL,BL WRITE NUM WRITE CRLF WRITE CRLF WRITE CRLF WRITE CRLF	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month ;write month to log file ;skip a space ;write "19" portion of year ;retrieve year from stack ;aubtract century portion ;write year to the log file ;finish with CRLF pairs	WRITE_NUM ; WRITE_NUM ; WRITE_HEADE TITLES EQUALSIGN WRITE_HEADER WRITE_HEADER WRITE_CRLF ; WRITE_CRLF ; CRLF	ASSUME AAM ADD OR JS CMP JHE HOV XCHG MOV MOV MOV MOV MOV MOV INT RET EHDP R Writes t DB	DS:CODE AX,3838H BL,BL WRNUWI AH,38H WRNUWI AH,28H AH,AL FILEWORD,AX AH,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUF (32),"E "ELAPSED",4 DUF (32), "PROGRAM",18 DUF (32), "BEAR DS:CODE AH,48H BX,RAWDLE CX,67 DX,OFFSET TITLES 21E CX,79 CX AH,48E CX,1 DX,OFFSET EQUALSIGN 21E CX 21E CX AH,48E CX,1 DX,OFFSET EQUALSIGN 21E CX CX AH,48E CX,1 CX CX CX AH,48E CX,1 CX	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file e log file. MD*,5 DUP (32) *LEVEL*,4 DUP (32) ,*PARAMETERS*,13,16 ;write column titles ;write row of *=" symbols ;end it with a CR/LF pair</pre>
WRITE DATE WRITE DATE WRITE DATE WRITE DATE WRITE DATE	PROC ASSUME CALL HOV INT PUSH HOV ZOR HOV JCKZ ADD LOOP HOV HOV INT HOV CALL HOV HOV INT POP SUB NOV XOR CALL RET ENDP	GUTTENT date to the 10 "JanfebNerAprNayJunJu" "19" WEAR DE:CODE MRITE CRLF AH, 2AH 21B CX AL,DL BL,BL WRITE HUN CL,DH CH,CH DX,OFFSET HONTHS MRDATE2 DX,3 WRDATE1 AH, 46B SX, HANDLE CX,3 21B CX,1 WRITE SPACES AH, 46B CX,2 DX,OFFSET CENTURT 21H CX CX,1 SAL,CL BL,BL WRITE NUM WRITE CRLF WRITE CRLF WRITE CRLF WRITE CRLF WRITE CRLF	;akip one line ;get date from DOS ;save it ;write day of the month to ; the log file ;skip a space ;retrieve month from stack ;calculate offset into NONTH ; table of text for the ; current month ;write month to log file ;skip a space ;write "19" portion of year ;retrieve year from stack ;aubtract century portion ;write year to the log file ;finish with CRLF pairs	WRITE_NUM ; WRITE_NUM ; WRITE_HEADE TITLES EQUALSIGN WRITE_HEADER WRITE_HEADER WRITE_CRLF ; WRITE_CRLF ; CRLF	ASSUME AAM ADD OR JS CMP JSC MOV MOV MOV MOV MOV MOV MOV MOV INT RET RET RET RET RET RET RET RET RET RE	D8:CODE AX,3838H BL,BL WRNUM1 AH,38H WRNUM1 AH,29H AH,AL FILEWORD,AX AB,48H BX,HANDLE CX,2 DX,OFFSET FILEWORD 21H Che column titles to th "START",5 DUP (32),"E "ELAPEED",4 DUP (32), "PROGRAM",18 DUP (32) """ MEAR D8:CODE AB,48H BX,HANDLE CX,67 DX,OFFSET TITLES 21E CX,79 CX AB,48E CX,1 DX,OFFSET EQUALSIGN 21E CE WRHEADI WRITE_CRLF CETTIAGE FETURE 13,18 MEAR D8:CODE AH,48H	<pre>;convert to ASCIT ;convert leading zero to ; space if BL = 1 on ; entry ;swap bytes ;store them ;then write them to the ; log file. MD*,5 DUP (32) "LEVEL",4 DUP (32) ,"PARAKETERS",13,16 ;write column titles ;write row of "=" symbols ;end it with a CR/LF pair</pre>

■ UTILITIES

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WRITE_CRLF	ENDP				POP	DI.OFFSET CWDIR+88	; filespec buffer
WRITE SPACES	writes (X spaces to the log file	0.		CALL	GEMSPEC DX.OFFSET ERRMSGS	generate complete filespec gexit if error flag is set
SPACE	DB	32			NOA.	ERROR EXIT DI, OFFSET CWDIR+86	on return ifind the terminating zero i
FRITE_SPACES	PROC	NEAR DS:CODE			NOV NOR NOV	DI, OFFSET CWDIR+88 AL, AL CX, 88	ifind the terminating zero in the ASCIIS string
	PUSH HOV HOV	CX AR. 48N	;save counter ;write one space		REPUE	SCASB	
	MOA. MOA.	EX, NAMBLE CX, 1 DX, OFFSET SPACE			CMP JHE MOV	BYTE PTR [DI=1],"\" TESTSPEC SI,OFFSET DEFMAME+1	rappend default filename if last character is a backelash
	INT	21H	;retrieve count		REP	CX,9 HOVEB	,
ORITH SPACES	LOOP RET EMDP	WALTE STACES	;loop until done		NOR STOSS	AL, AL	;write ASCIIS terminator
10000000000000				TESTSPEC:	NOV	DX,OFFSET CWDIR+68	if it doesn't already exist.
	records t	the current time in the	slot designated by LEVEL.		MOV	OPENFILE DX,OFFSET ERRHSG5	perror if file could not
ECORD_TIME	PROC	WEAR DS:CODE			JC CALL	ERROR EXIT	; be opened
	HOV	8 9 2CH	get current time		CALL	RECORD TIME	record starting time
	TWT	21H BX, LEVEL	;calculate offset into table		ENT	21H	; LOG is running under
	SHL	BX,1 BX,1	; of start/end times		WOV	AH, AL DOSVERSION, AX	
	WOV	WORD PTR TIMES[BX],CX BYTE PTR TIMES[BX+2],D	;store current time	;Hook into i	nterrupt HDV	21h and deallocate the Ax. 3521N	program's environment block. save old interrupt vector
RECORD TIME	RET		~		INT	21H WORD PTR INT218,8K	,
	ENDP		*******************		WOV	WORD PTR INT218,82 AK, 25218	
; 418-byte buf	for area	used after LOG becomes :	resident.		HOW	DX.OFFSET DOSTHY	; then set the new vector
PE FYLESPEC	:	\$ PC	#13 b-##		TWT	21 W	
PC	-	PC + 88	:filespec buffer		VOM	AK,DS:[2CH] ES,AK	deallocate the program's
NAMES FC	-	PC + 13#	: storage array for program : names		INI	AB, 49H 21H	
TIMES	-	PC + 48	setorage array for program start/end times	;Initialize	buffer as	ceas. CS	point ES to code segment
PC BTACKSEG	-	PC .	tetorage array for SS		POP	EE	
FE STACKPTR	=	PC + 28 PC	register values		VON	SI,OFFSET CHDIR+88 DI.OFFSET FILESPEC	;copy filepsec string to ; filespec buffer
PC COMLINE		PC + 28	storage array for SF register values command line parameter buffer	COPYLOOP:	LODES	21,01121 1222120	,
PC LASTBYTE	-	PC + 128	icommune line barameter purses		OR	AL, AL	
LASTBYTE		PC	**********************		JHE	COPYLOOP SI, OFFSET IDLETEXT	coom reidlant atring to
: INITIALISE i	nstalls :	or uninstalls the progres	m .		HOV	DI,OFFSET HAMES CX,7	;copy " <idle>" string to</idle>
rrenggi	DB	"Usage: LOG [filespec]	[/0]\$*		200		
ERRMSG2 ERRMSG3	DB DB	"Usage: LOG [filespec] "Not Installed6" "Cannot Uninstall6"		;Display cop	yright no	tice, then terminate as	nd remain resident in memory. jdisplay copyright
ERRMSG4	DB	"Already Installed\$" "Invalid Filesper\$"			MOV	DX.OFFEET PROGRAM	latebrah cohiridac
DANAUCA	DB DB	"Invalid Filespers"					
		"Uninetalleds"			IWP MOV	23R AX. 3188R	
DEFNAME	DB	"\USAGE.LOG",13			YOM	AX,3180E DX,(OFFEET LASTSYTE -	OFFSET CODE + 15) SHR 4
DEFNAME IDLETEXT INSTALLED				INITIALISE	3907	AX. 31.66H	OFFSET CODE + 15) SHR 4
IDLETENT INSTALLED	DB DB DB	"\USAGE.Log",13 6," <idle>"</idle>		1	MOV MOV ZHT EMDP	AX,3188H DX,(OFFSET LASTSYTE - 21H	
IDLETENT INSTALLED INSTALLES	DB DB DB	"\USAGE.LOG",13 6," <idle>" 0</idle>	MANAPY.	FEMOVE deall interrupt ve	MOV NOV INT EMDP locates the	AX, 3188E DX, (OFFEST LASTRYTS - 218 DE memory block address placed on installation. to release	nd by ES and restores the
IDLETENT INSTALLED INSTALLES	DB D	"\USAGE.LOG",13 6, <idle>" 6</idle>	clear DF for string ons	FEMOVE deall interrupt ve	MOV NOV INT EMDP locates the	AX, 3188E DX, (OFFEST LASTRYTS - 218 DE memory block address placed on installation. to release	
IDLETERT INSTALLED INSTALLES	DB DB DB DB FROM CLD MOV CLD	"\USAGE.Log",13 6, <idle>" 8 HERM CS:CODE, DS:CODE 3 is already resident in WORD FTR (BEGIN),8 BK.BK</idle>	clear DF for string ops	FEMOVE deall interrupt ve	MOV MOV THT EMOP Cocates the cotor disp segment clear - pr	AX, 3168E DX, (OFFSET LASTSYTE - 218 se memory block address- slaced on installation. to release ourse uninstalled, CF (ed by ES and restores the
IDLETENT INSTALLED INITIALIZE ;See if a co	DB D	"\Usade.Log",13 6," <idle>" 8 HERR S::CODE, D8::CODE G is already resident in WORD PTR (BEGIN),8 BX,SR AX,CS</idle>	;clear DF for string ops ;initialize fingerprint ;zero BX for start ;keep CS value in AX	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	MOV MOV THT EMDP Cotor disp segment :lear - pr	AX, 3168E DX, (OFFSET LASTSYTE - 218 se memory block address- slaced on installation. to release ourse uninstalled, CF (ed by ES and restores the
IDLETENT INSTALLED INITIALIZE ;See if a co	DB D	"Unace:Log",13 6, "cidle>" 8 HERH CS:CODE, DS:CODE 5 is already resident in MORD PTR (BEGIN),8 BX,05 B	clear DF for string ops finitialize fingerprint facto BK for start theep CS value in AX fincrement search segment value	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	MOV NOV INT ENDP Cocates the settor disp segment clear - pr FROC NOV SOV INT	AX, 3168R DX, (OFFST LASTSYTE - 218 DS memory block address blaced on installation. to release opram uninstalled, Cf (BEAR CA, ES AV, 35218	nd by ES and restores the
IDLETENT INSTALLED INITIALIZE ;See if a co	DB DB DB DB BENCE BENEFINE CLD NOV XOR MOV INC HDM CMM JE	"\USANGE.LOG",13 6, "cidle>" 0 HERM CS:CODE, DS:CODE G is already resident in WORD PTR (BEGIN),8 BX, SX AX, CS BX, BX BX, BX BX, BX BX, BX	;clear DF for string ops ;initialize fingerprint ;mero BX for start ;keep CS value in AX ;increment search segment value ;not installed if current	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV NOV THT EMOP Locates the locates the l	AX, 31688 DX, (OFFST LASTRYE - 218 De memory block address blaced on installation. to release cogram uninstalled, Cf of NEAR CX,ES 218 AX, 35218 AX, 2X	ed by ES and restores the
IDLETENT INSTALLED INITIALIZE ;See if a co	DB D	"\USANGE.LOG",13 6, "cidle>" 0 8 HERMA CS:CODE, DB:CODE CS:CODE, DB:CODE CS:CODE, DB:CODE SI BEN	clear DF for string ops initialize fingerprint jearc BX for start jkep cS value in AX jincrement search segment value jnot installed if current j segment is reached jearch this seament for ASCIX	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV THT ENDP Cocates the segment lear - pr PROC HOV HOV HOV CHP JNE	AX, 1188R DX, (OFFST LASTRYE - 218 memory block address laced on installation. to release opram uninstalled, CF of EEAA CX, 25 AX, 35218 AX, 25 AX,	nd by ES and restores the set - can't uninstall jabort if the interrupt 21h ; watter has been altared ; since installation
IDLETENT INSTALLED INITIALIZE ;See if a co	DB DB DB BENCE BEIGURE DDY Of LOCALD MOV LOCALD MOV CMP JE MEN HEN HEN HEN HEN HEN HEN DB	"\USAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, D8:CODE 3 is already resident in MORD PTR (BEGIN),8 BX, BX AX, CS BX, BX AX, IX AX, IX BX, BX AX, BX PARENT BROWN BI, OFFER BROWN CX, 15 CX, 15	;clear DF for string ops ;initialize fingerprint ;mero BX for start ;keep CS value in AX ;increment search segment value ;not installed if current	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV ZHT ENDP Locates the segment lear - pr PROC HOV HOV JUT HOV CHP JUE HOV HOV HOV HOV HOV HOV HOV HOV HOV HOV	AX, 148FB DX, (OFFST LASTRYE - 218 se memory block address- laced on installation. to release oppras uninstalled, CF offst offst oppras uninstalled, CF oppras uninstalled, CF offst oppras uninstalled, CF offst oppras uninstalled, CF offst oppras uninstalled, CF	nd by ES and restores the set - can't uninstall jabort if the interrupt 21h ; watter has been altared ; since installation
IDLETENT INSTALLED INITIALIZE ;See if a co	DB DB DB FRICE SAMEUME DDY Of LOC CLD MOV KOR MOV INC HINC HINC HINC HINC HINC HINC HINC	"\USANGE.LOG",13 6, "cidle>" 8 EBENE CB:CODE, DB:CODE Gs already resident in MORD PTR (BEGIN),8 BX, SR AC, CB BX, BX AX, BX PANEST BY, BX AX, BX PANEST BI, OFFERT BRGIN	colear DF for string ops initialize fingerprint perc BE for start heep CB value in Az increment search segment value not installed if current segment is reached search this segment for ASCII fingerprint	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV INT ENDP Cocates the cotor dis- segment lear - pr FROC HOV INT HOV CHP JNE HOV HOV HOV HOV HOV HOV HOV HOV HOV HOV	AX, 1188R DX, (OFFET LASTRYE - 218 semency block address laced on installation. to release operam uninstalled, CF of MEAR X, 2521H AX, 252 AX, CX REMOVE REMOR ES, CX AX, 498 BAX, 498	nd by ES and restores the set - can't uninstall jabort if the interrupt 21h ; wattor has been altared ; since installation
TOLETET INSTALLED INVITALIZE ;See if a co	DB DB DB ENCE RESUME DOPY OF LOW ROOM ROOM ROOM ROOM ROOM ROOM ROOM REPE JIME REPE JIME ROOM ROOM REPE REPE REPE ROOM ROOM REPE REPE REPE REPE ROOM ROOM REPE REPE REPE REPE REPE ROOM REPE REPE REPE REPE REPE REPE REPE REP	"\USAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE 3:s already resident in WORD PTM (BEGIN),8 BM, BM AM, CE BE, BM AM, SM AM, SM PARSET PARSET BI, ST CK, 16 EMERICA HERMELED,1	clear DF for string ops initialize fingerprint jearc BX for start jkep cS value in AX jincrement search segment value jnot installed if current j segment is reached jearch this seament for ASCIX	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV HOV THE ENDP COCATES the COCATES SEGMENT HOV HOV HOV HOV HOV HOV HOV HOV HOV HOV	AX, 148FR DX, (OFFST LASTRYE - 218 memory block address laced on installation. to release oprem uninstalled, CF MEAR EAR AX, 3521E AX, 3521E AX, 45E AX, 45	ed by ES and restores the
TOLETET THEFALLED THITIALIZE ;See if a co THITI THITI ;Farse the c PARSE:	DB DB DB ENCE RESUME DB ENCE RESUME DC LO RO	"\USAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, DS:CODE G & already resident in HORD PTR (BEGIN),8 M., BX M., CS M., BX M., CS M., BX M., CS M., BX M.,	sclear DF for string ope jinitialize fingerprint jinitialize fingerprint place of value in AX jincrement mearch segment value jinot installed if current j segment is reached jeach this begment for ASCII j injerprint ;loop back if not found jast installed ilsy	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV INT EMOP EMOP INT EMOP EMOP FROC HOV CHP JRE HOV CHP JRE HOV INT JC HOV	AX, 3189R DN, (OFFET LASTRITE - 218 memory block address to release ogram uninstalled, CF of EAA, CX, ES 218 AX, CX ESB, CX AX, SS 218 AX, CX ESB, CX CX E	od by ES and restores the set - can't uninstall short if the interrupt 2th y wector has been altered y since installation free memory given to y original program block branch on error
IDLETERT IMPSTALLED INITIALISE ;See if a co INITI: INITI	DB DB DB ERCC RESUME DB ERCC RESUME DC CLD SCON HOV SCON HOV HOV HOV HOV REPE JMC REV REPE LODSE CMC REV LODSE CMC	"\USANGE.LOG",13 6, "cidle>" 6 HERME CS:CODE, D8:CODE G is already resident in WORD PTR (BEGIN),6 BX, BX BX BX, BX B	colear DF for string ops initialize fingerprint perc BE for start heep CB value in Az increment search segment value not installed if current segment is reached search this segment for ASCII fingerprint	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV THE END PROCESS OF THE PUBLISHED ASSUNG NOV LOS	AX, 3188R DN, (OFFET LASTWITE - 218 MEMORY block address- to release copras uninstalled, CF of EXA, E AX, 35218 218 218 218 218 218 228 228 238 248 258 258 258 258 258 258 258 258 258 25	od by ES and restores the set - can't uninstall short if the interrupt 2th y wector has been altered y since installation free memory given to y original program block branch on error
TOLETET THEFALLED THITIALIZE ;See if a co THITI THITI ;Farse the c PARSE:	DB DB DB ERECE LEBUME DB ERECE LEBUME DB ERECE LEBUME MOV LOD	*\USAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, D8:CODE 5 is already resident in MORD PTR (BEGIN),8 BX, BX AX, CS BZ, BX AX, BX PARENT BI, OFFERST BRUIN BI, OF	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jloop back if not found jast installed flag joint SI to command line jost a character jakip it it's a space	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV HOV THT ENDP Cocates the otor dispersion respent r	AX, 148FR DX, (OFFST LASTRYE - 218 memory block address laced on installation. to release operate uninstalled, CF / MEAR MEAR MEAR AX, 35218 AX, CE AX,	od by ES and restores the set - can't uninstall short if the interrupt 2th y wector has been altered y since installation free memory given to y original program block branch on error
TOLETET THEFALLED DESTINATE: ;See if a co INIT1: ;Farse the c PARSE:;	DB DB DB DB DB EROC EASIVEE EASIVEE CLD EOV	"\USAGE.LOG",13 6, "cidle>" 8 BEERE CS.CODE, D8:CODE G18 already resident in MORD PTR (BEGIN),8 MX,5X AX,CS MX,5X PARSE B1,07FSET BROIN B1,07FSET BROIN B1,071 B1,0	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jloop back if not found jast installed flag joint SI to command line jost a character jakip it it's a space	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV INTERPRETATION OF THE POP ARRUME BOT INT POP POP ARRUME BOT INT POP POP ARRUME BOT INT POP ARRUME BOT IN	AX, 3188R DN, (OFFET LASTWITE - 218 MEMORY block address- to release copras uninstalled, CF of EXA, E AX, 35218 218 218 218 218 218 228 228 238 248 258 258 258 258 258 258 258 258 258 25	short if the interrupt 21h; sector is the interrupt 21h; sector has been altered; since installation free semony given to original program block; shranch on error; resetors interrupt vector
TOLETET THEFALLED DESTINATE: ;See if a co INIT1: ;Farse the c PARSE:;	DB DB DB DB EMCC LEBUUM DPY of LO CLD MOV EMP JE MOV EMP JE CMP JE CM	"\USAGE.LOG",13 6, "cidle>" 8 BEERE CS.CODE, D8:CODE G18 already resident in MORD PTR (BEGIN),8 MX,5X AX,CS MX,5X PARSE B1,07FSET BROIN B1,07FSET BROIN B1,071 B1,0	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jloop back if not found jast installed flag joint SI to command line jost a character jakip it it's a space	REMOVE deals	HOW HOW THIS END PROCESS OF SECURITY OF SE	AX, 3188R DX, (OFFET LASTRITE - 218 DE memory block address laced on installation. OGCHARL AND	pad by ES and restores the set - can't uninstall jabort if the interrupt 21h ; wattor has been altared ; since installation ;free memory given to] original program block ;branch on error ;restore interrupt vector ;destroy ABCII fingerprint ;clear CF for exit
IDLETERT IMPSTALLED INITIALISE ;See if a co INITI: INITI	DB DB DB DB DB DB DB EMICE EMISTER EMISTER EMISTER EMISTER EMIST E	"\USAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, D8:CODE 5 is already resident in WORD PTR (BEGIN),8 MX, SX AX, CS MX, SX AX, SX PAREST 1.0FFST BEGIN 11.0FFST B	sclear DF for string ope jinitialize fingerprint jinitialize fingerprint jheep CS value in AX jincrement esearch segment value jmot installed if current j segment is ranched jearch this segment for ASCII j fingerprint jloop back if not found jest installed flag jpoint SI to command line jest a character jakip it if it's a space jexti thosy when a carriage jextic to forward sleep jextic too forward sleep	; REMOVE deall ; interrupt we ; Entry: ES - ; Exit: CF o	HOV THY HOV THY ENDP LOCATES IN THE HOTO CARE IN THE HOV CHO THE HOV CHO THE HOV THY THE HOVE	AX, 3188R DX, (OFFET LASTRITE - 218 DE memory block address laced on installation. OGCHARL AND	pad by ES and restores the set - can't uninstall jabort if the interrupt 21h ; wattor has been altared ; since installation ;free memory given to] original program block ;branch on error ;restore interrupt vector ;destroy ABCII fingerprint ;clear CF for exit
TOLETET THEFALLED DESTINATE: ;See if a co INIT1: ;Farse the c PARSE:;	DB D	"\USAGE.LOG",13 6, "cidle>" 8 **ERRE CS.CODE, DS.CODE G & already resident in NOOLD PTR (REGIN),8 M., SX AX, CS B., SX B	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jheep CS value in AX jincrement search segment value jmot installed if current segment is reached search this segment for ASCII ; insperprint is reached jearch this segment for ASCII ; insperprint is reached just installed flag point SI to commend line jeat a character sakip it if it's a space serious when a carriage serious when a carriage	REMOVE deals	HOV THY ENDP COCATES TO TOTAL THE ENDP COCATES TO THE END THY HOVE THE END THE END THY HOVE THE END THY HOVE THE END THY HOVE THE END THY HOW THE END THY HOVE THE END THY HOVE THE END TH	AX, 3188R DX, (OFFET LASTRITE - 218 DE memory block address laced on installation. OGCHARL AND	net - can't uninstall short if the interrupt 21h swettor has been altered since installation free semony given to original program block branch on error restore interrupt vector
TOLETET THEFALLED JWITIALITE	DB D	"\USAGE.LOG",13 6, "cidle>" 8 **ERRE CS.CODE, DS.CODE G & already resident in NOOLD PTR (REGIN),8 M., SX AX, CS B., SX B	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jheep CS value in AX jincrement search segment value jmot installed if current segment is reached search this segment for ASCII ; insperprint is reached jearch this segment for ASCII ; insperprint is reached just installed flag point SI to commend line jeat a character sakip it if it's a space serious when a carriage serious when a carriage	REMOVE ERROR: REMOVE ERROR: REMOVE ERROR: REMOVE ERROR:	HOW THIN HOUSE THE POPE HOUSE THE POPE HOUSE HOW THE POPE	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	pet or year or restore the set - can't uninstall sabort if the interrupt 2th vector has been altered since installation free semony given to restore interrupt vector restore interrupt vector restore interrupt vector restore or restore interrupt vector restore restore interrupt vector restore restore
TOLETET THE TALLED INITIALITE ;See if a co INITIALITE ;See if a co INITI: ;Parse the c PARSE1: PARSE2:	DB D	*\USBAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, D8:CODE Sis already resident in MORD PTR (BEGIN),8 8X,5X AX,CS 8X,5X AX,CS 8X,5X AX,SX PARSES 1.0FFST BROIN 11.0FFST BROIN 11.0FFST BROIN 11.0FFST BROIN 11.0FFST BROIN 12.0FFST BROIN 12.0FSST BROIN 13.0FSST BROIN 13.0FSST BROIN 13.0FSST BROIN 13.0FSST BROIN 13.0FSST BROIN 14.0FSST BROIN 14.0FSST BROIN 15.0FSST BROIN 15.0FSST BROIN 16.0FSST BROIN 16	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jheep CS value in AX jincrement earch segment value mot installed if current j segment is reached jearch this segment for ASCII jloop back if not found jast installed flag jingerprint it is space jewit loop when a carriage jewit loop when a carriage jext those when a carriage jingthing slee is a filespec joek for forward sleeh janything slee is a filespec joektalize it branch to uninstall code if j character is a "o" loop string in the string of the string jingthing sleek is a filespec joektalize it branch to uninstall code if j character is a "o" loof measure and string on the string of the string of the string j character is a "o" loof measure and string on the string of the string of the string j character is a "o" loof measure address.	REMOVE ERROR: REMOVE ERROR: REMOVE ERROR: REMOVE ERROR:	HOW THIN HOUSE THE POPE HOUSE THE POPE HOUSE HOW THE POPE	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	pet or year or restore the set - can't uninstall sabort if the interrupt 2th vector has been altered since installation free semony given to restore interrupt vector restore interrupt vector restore interrupt vector restore or restore interrupt vector restore restore interrupt vector restore restore
TOLETET MESTALLED INITIALITE See if a co INITIALITE Parse the c PARSE: Parse the c Parse the c Parse the c Parse the c	DB D	-\USBAGE.LOG",13 6, "cidle>" 8 HERME CS:CODE, D8:CODE G1s already resident in MORD PTR (BEGIN),8 MX, 5X AX, CS MX, 5X AX,	sclear DF for string ops junitalize fingerprint jinitalize fingerprint jinitalize fingerprint jheep CS value in AX jincrement search segment value jmot installed if current j segment is reached jearch this segment for ASCII jingerprint is reached jearch this segment for ASCII jingerprint is reached junitalized fing junitalized fing junitalized fine percentage jear the command line jear a character jakip it if it's a space jear tioop when a carriage jear the monountered jear the monountered jear the sear character jear the monountered jear the monoun	REMOVE Gene REMOVE REMOVE ERRORS	HOV INTO HOV INTO HOV INTO HOV INTO HOV INTO HOV HOV HOV HOV HOV HOV HOV HOV HOV HO	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	pad by ES and restores the et - can't uninstall jabort if the interrupt 2th ; sector has been altered ; since installation ; free memory given to ; original program block ;branch on error ;restore interrupt vector ;destroy AMCII fingerprint ;clear CF for exit ;set CF to indicate program ; couldn't be uninstalled iffer set - drive/directory invalid
TOLETET MESTALLED INITIALITE See if a co INITIALITE Parse the c PARSE: Parse the c Parse the c Parse the c Parse the c	DB D	*\USAGE.LOG",13 6, * <id>*\USAGE.LOG",13 6, *<id>*\USAGE.DE.CODE 6. *\USAGE.DE.CODE 6. *\U</id></id>	clear DF for string ops jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jheep CS value in AX jincrement earch segment value mot installed if current j segment is reached jearch this segment for ASCII jloop back if not found jast installed flag jingerprint it is space jewit loop when a carriage jewit loop when a carriage jext those when a carriage jingthing slee is a filespec joek for forward sleeh janything slee is a filespec joektalize it branch to uninstall code if j character is a "o" loop string in the string sleek is a filespec joektalize it branch to uninstall code if j character is a "o" loof measure and string sleek is a filespec joektalize it branch to uninstall code if j character is a "o" loof measure address	REMOVE ERRORS REMOVE ERRORS REMOVE RE	HOW THY ENDP ENDP ENDP ENDP ENDP ENDP END	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	ped by Es and restores the et - can't uninstall sabort if the interrupt 2th vector has been altered since installation free semory given to original program block branch on error restore interrupt vector idestroy ASCII fingerprint colear or for earl couldn't be uninstalled original couldn't be uninstalled or dive/directory invalid
TOLETET WESTALLED INITIALITE See if a co INITIAL INI	DB D	-\USBAGE.LOG".13 6, "cidle>" 8 BEERE CS:CODE, D8:CODE S a large president in WORD PTR (BEGIN),8 MX, 5X AX, CS SX AX,	iclear DF for string ops junitalize ingerprint jinitalize ingerprint jinitalize ingerprint jheep CS valus in AX jincrement essent new segment value mot installed if current j segment is reached jeanch this segment for ASCII j segment is reached jeanch this segment for ASCII jingerprint is reached jeanch this segment for ASCII jingerprint is reached jeat to command line jeat a character jeat those when a carriage jeat the seat character jeat the newt character jeat the newt character jeat the meat character jeat the meat character jeat uninstall code if j character is a "U" y error message jeat the formal processing the perior message jeat the formal process of the perior message jeat with ERMONLEVEL = 1	REMOVE Geals REMOVE ERROR: REMOVE ERROR: REMOVE HOV MOV THY PROPERTY OF THE PR	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	pet or burst of the sector of	
IDLETER UNITALITE	DB D	- (USAGE.LOG",13 6, ~Cidle>" 8 BEERE CS.CODE, DS.CODE GS. & already resident in MORD PTR (BEGIN),8 M., SX AX, CS S., SX DS., S	iclear DF for string ops junitalize ingerprint jinitalize ingerprint jinitalize ingerprint jheep CS valus in AX jincrement essent new segment value mot installed if current j segment is reached jeanch this segment for ASCII j segment is reached jeanch this segment for ASCII jingerprint is reached jeanch this segment for ASCII jingerprint is reached jeat to command line jeat a character jeat those when a carriage jeat the seat character jeat the newt character jeat the newt character jeat the meat character jeat the meat character jeat uninstall code if j character is a "U" y error message jeat the formal processing the perior message jeat the formal process of the perior message jeat with ERMONLEVEL = 1	REMOVE GRADE REMOVE ERROR: REMOVE ERROR: REMOVE HOW THY ENDP ENDP ENDP ENDP ENDP ENDP END	AX, 3188R DN, (OFFST LASTWITE - 218 **BROWNEY** DATASET LASTWITE - 218 **DEATH	pate to the interrupt 2th ; wector has been altered; successful program block; successful program block; presence interrupt wector has been altered; since installation; original program block; presence on error; presence interrupt wector indicate program; couldn't be uninstalled before a first and interrupt wector interrupt wec	
IDLETER UNITALITE	DB D	"VORAGE.LOG",13 6, "Cidle"> 6 6 6, "Cidle"> 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	clear DF for string ops juintialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jinitialize fingerprint jloop back if not found jast installed flag joint SI to command line jet a character jakip it if it's a space jet those when a carriage jintuntialize fingerprintialize jintuntialize fingerprintialize jintuntialize it jointialize it jointial	REMOVE Geals REMOVE ERROR: REMOVE RE	HOV NOV THE PROPERTY OF THE PR	AX, 3188E DN, (OPPET LASTBYTE - 218 SESSED DN, (OPPET LASTBYTE - 218 SESSED DN, (OPPET LASTBYTE - 218 ZEAA CX, ES ZIN ZIN ZIN ZIN ZIN ZIN ZIN ZIN ZIN ZI	pet or to make the set of the set
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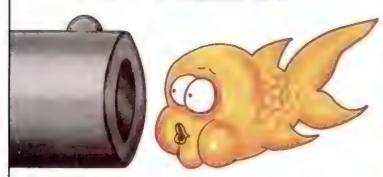
■ UTILITIES

	AND	AL, SDFH SHORT GEN2	; drive letter if it does	1	MOV	SI, ADDROUT DL, (SI)	; directory string from
) Doe
GEW1:	HOV	AL, DEFORIVE	get default drive letter		sus	DL, 48H	
	ADD	AL, "A"	convert to ASCII	1	ADD	SI,3	
	MOA	AH, "1"	rappend colon		MOV	STIE PTR (SI-1),"\"	
GEM21	STOSW		; and output drive spec	1	INT	218	
7Scan the			backslash character.		30	GEN_EXIT	;exit on error
	3607	ADDRIN, SI	;save filespec address	;Reset the		trive and directory.	
	XOR	CK, CK	;initialize counter		NOV	AH, PEH	reset default drive
GEH3:	LODES		get next byte		WOV	DL, DEFORIVE	
	CKP	AL, 0DH	secan finished if character	1	INT	218	
	JE	GER4	; is a carriage return or		MOV	AH, 3RE	;finish up by setting the
	CMP	AL, 28H	1 Space		NOV	DX, OFFSET CMDIR	; current directory to what
	JE	GEW4			236.5	21R	; it was when we started
	CMP	AL, "\"	;loop back if it's anything		JC	GEN EXIT	
	JNE	GEW3	i but a backslash	1Append the	filename	to the directory speci	fication if one was entered.
	NOV	CK.SI	reave address of backslash		MOV	DI.ADOROUT	:find ASCIIE terminator byte
	DEC	CX	1 character and return to		300R	AL. AL	in output buffer
	JWP	GEN3	r scan loop	1	HOV	CX, 88	
1Copy eve	rything up	to the last backslash	to the output buffer.	1	REPWE	SCASS	
GR014 :	MOV	ADDRELASH.CX	seave backslash address	1	DEC	DT	
	MOV	MI ADDRIN	spoint SI back to filespec	1	CHIP	BYTE PTR (DI-1)."\"	timeert a backslash if
	OR	CX.CX	sterminate string if no	1	JE	CERTIF	1 there's not one at the
	JE	GEN6	: backslashes found	1	MOV	AL. "\"	end of the string
	CMP	SI.CX	scopy leading backslash if	1	STORE	, , ,	/ end or the merring
	JE	GRUS	if it was the only one	GENTA:	WOW	SY. ADDRSTAGE	spoint BI to the first
	RUB	CX.SI	jotherwise copy everything	deno.	OR	SI.SI	: character in the
	DEC	CX	up to the last backslash		JWE	GEER 9	: input filename
	JCXE	GENS	, ab co con lest perkelest		MOV	SI ADDRIN) subac ravenesse
	BEP	MOVSD			23CP	SHORT GENTS	
GEN5:	MOSSER	1000		CHING :	XHC	SI CENTE	
GEN6:	KOR	AL. AL	rappend binery sero to form	GEN18:	LODGE	91	copy characters until a
dPMA1	STOSB	May May	: ASCIIS string	GRATA:	CMP	AL. ODM	: carriage return or space
		and directors specific	ed and get a full pathname.		JE	GEDET 1	delimiter is reached
Josephange C	MON.	AR. SEN	switch current drive			AL. 200	; delimiter is reached
	HOW WOW	DI ADDROUT	immircu carrent arive	1	CHEP		
	HOV	DL, ADDROUT		1		GEN11	
	SUB	DL, "A"		1	STORB		
	INT	21 H			JHP	GEN19	
	CHP	BYTE PTR (DI+2).0		GEW11:	XOR	AL, AL	rappend terminating zero byte
	JE	STIE FIR (DI+2), F			STOSE		; to string
	JE MOV				CLC		clear CF and exit
	MOV	AN, 3BR	set current directory to	GRN_EXIT:	RET		
		DK, ADDROUT	; the one just formulated	GENSPEC	ENDP		
	ADD	DK, 2	; and exit if the call fails	CWDIR	DB	-/-	directory string buffer
	INT	218		CODE	ENDS		
	JC	GEM_EXIT			SET O	BBGIW	(LOG_ASM ends)
GEN7 1	MOV	AH, 47E	inow request a complete	*			(LICO TOTAL ENGL)

18 SEM - BARIC PROGRAM TO CHRATE LOG.COM * AS \$1 LEW = 1 12 FIRED \$1, 1 AR AS: CHECKEUN\$=6 13 FOR 1 1 TO 11 AR AS: CHECKEUN\$=6 13 FOR 1 1 TO 11 AR AS: CHECKEUN\$=6 13 FOR 1 1 TO 12 AR AS: CHECKEUN\$=6 13 FOR 1 1 TO 12 AR AS: CHECKEUN\$=6 16 CHECKEUN\$=6 TO 12 AR AS: CHECKEUN\$=6 16 CHECKEUN\$=6 TO 12 AR AS: CHECKEUN\$=6 17 LINE CHECKEUN\$=1 TO 12 AR AS: CHECKEUN\$=6 18 FOR 1 1 TO 12 AR AS: CHECKEUN\$=6	760 DATA S1, 52, 8a, C2, 32, DB, 89, RF, B, BF, 1, 6, RF, 56, 1, 5a, FFE 776 DATA R4, 46, 88, 15, 48, 1, 89, 3, 87, 3, C2, 21, 89, 81, 22, 82, 87, 875 776 DATA R4, 46, 88, 15, 48, 1, 89, 3, 8, C2, 21, 89, 1, 8, 28, 34, 55, 58, 32, C2, 22, 82, 82, 82, 82, 82, 82, 82, 82, 8

LOG.BAS: An alternative way to create the LOG.COM utility is to run this program in BASIC.

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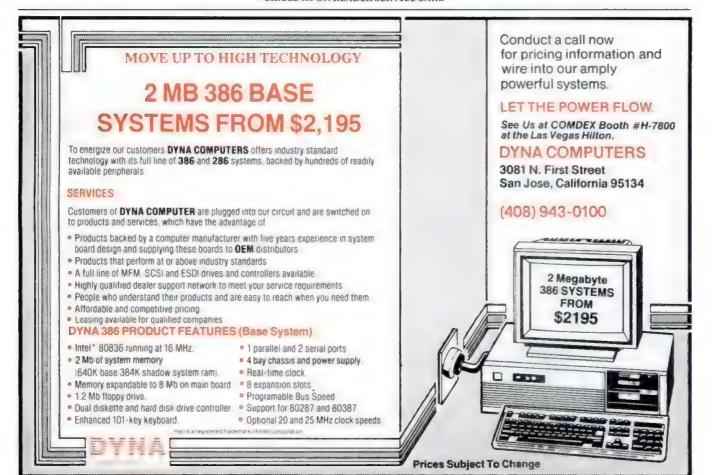


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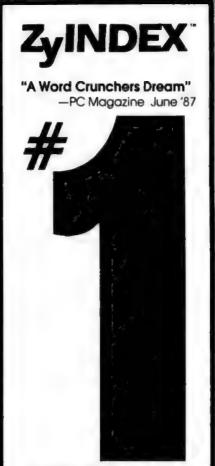
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UTILITIES

called the command tail) is exactly analogous to what's typed after the program name on the command line. Figure 3 shows the layout of the parameter block and gives a brief description of its contents.

After LOG copies the information it needs from the EXEC call, it increments the level number and calls EXEC to load and run the program. When control returns to LOG after the program terminates, LOG decrements the level number. The level number is used as an index to a set of internal, fixed-length tables LOG maintains in order to record up to ten nested layers of program names, start and end times, and other parameters. In the unlikely event: that the reentrancy count exceeds nine, LOG defers subsequent EXEC calls directly to DOS, until the count drops to a tolerable level again. Exceeding this limit: would allow LOG to overwrite its own data and to overwrite information in an area of memory it doesn't own.

Every call to or return from EXEC constitutes what I'll here call an "event." When a program is EXECed, another pro-

INT 21h Function Call 4Bh Parameter Block

ES:BX - WORD Offset: Segment address of environment placed at 2Ch of PSP. (Zero offset assumed.) Set segment to zero if parent's environment is to be inherited. **DWORD** 02h Pointer to command line image to be placed at 80h in

> (PSP). DWORD 06h

Pointer to File Control Block (FCB) to be placed at 5Ch in the PSP.

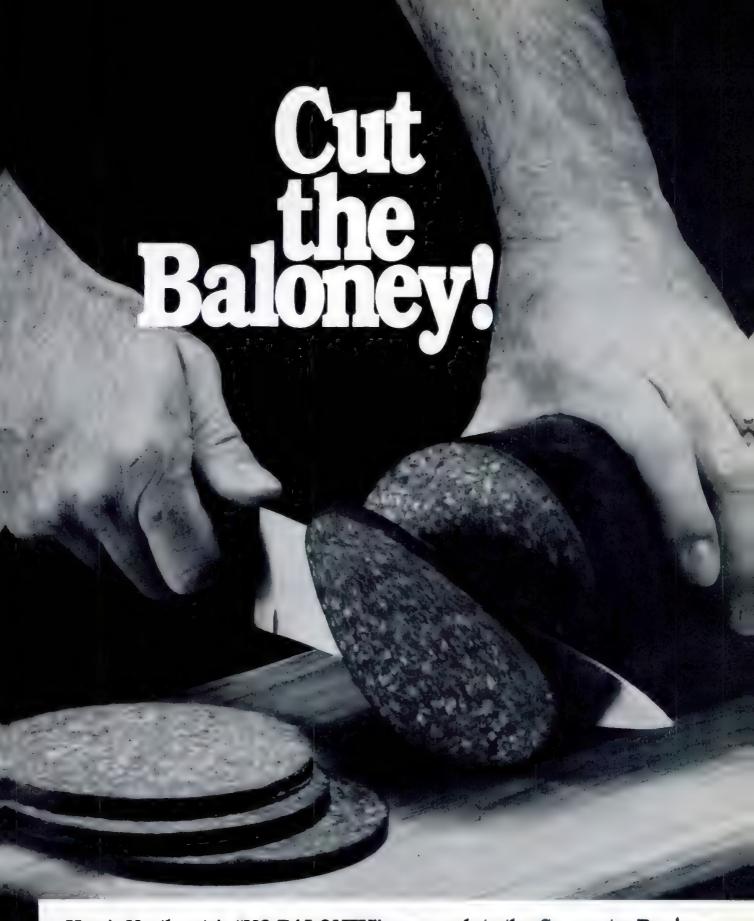
the Program Segment Prefix

DWORD

0Ah

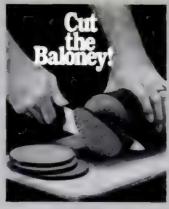
Pointer to second FCB to be placed at 6Ch.

Figure 3: The parameter block pointed to by ES:BX when AL=O (load and execute) in the EXEC function call.



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Commands

UTILITIES

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LOG Command

Jeff Prosise

1988 No. 21 (Utilities)

Purpose:

A memory-resident utility that automatically maintains a record of computer activity, which can assist you with maintaining tax records, client billings, and use-analysis.

Format:

LOG [filespec] [/U]

Remarks:

Entered without the optional *filespec* parameter, LOG opens a file named USAGE.LOG in the root directory of the current drive. The user may override any or all of the drive, path, and filename defaults by supplying the desired parameters as the *filespec* option when LOG is initially run. Although it can be executed from the DOS prompt, LOG is normally loaded by being included as a line in an AUTOEXEC.BAT file. Barring conflicts with other memory-resident programs, LOG can be uninstalled by executing the command with the /U parameter.

After listing the date, LOG files provide the start, end, and elapsed times for each program that is executed. The program name and any parameters entered with it are also logged, as is the "level" of DOS activity. At the first DOS prompt, the DOS command level is 0; a program running under DOS is at level 1; invoking a secondary copy of COMMAND.COM by shelling out from the program to DOS represents level 2, and so forth. LOG can track up to ten levels of DOS activity. Time spent at the DOS prompt is identified as <idle>. LOG does not record the use of internal DOS commands (DIR, CD, and REN, for example), or command calls that fail ("Bad command or filename"). LOG produces pure ASCII files that can be TYPEd to the screen or to a printer or used with a browse utility or text editor.

Available for downloading from PC MagNet (see the sidebar "LOG by Modem"), LOG.COM is already compiled and ready to run. LOG.BAS will automatically create LOG.COM when run once in BASIC. Creating LOG.COM from the LOG.ASM source code requires the use of a macro assembler (IBM or Microsoft, Version 2 or later) and the following commands:

MASM LOG; LINK LOG; EXE2BIN LOG LOG.COM

UTILITIES

gram (usually COMMAND.COM) has just been temporarily suspended. When execution returns to it, the program that was originally EXECed ends. Every time an event occurs, LOG writes a single line of information to the log file pertaining to the program just completed. The procedure OPENFILE is used to open the log file or to create a new one if one doesn't already exist; WRITE_ENTRY is called to write the log entry; and CLOSEFILE closes the open log file. LOG records the current time and uses it as the time the last program ended and the new one began.

DOS 3.0 introduced function 59h, which allows programs to request extended error information from DOS when a function call fails. With DOS 3.1 came the new (but undocumented) function 5Dh subfunction 0Ah, for setting extended error information. Function 5Dh takes as a parameter (in DS:DX) the address of an array of 8 words. These represent, in order, the states of the AX, BX, CX, DX, SI, DI,

DS, and ES registers upon return from function 59h.

Since LOG uses DOS functions to open, close, and write to a log file after an EXEC call is made but before passing control back to the parent process, any extended error information generated by the EXEC call will be lost unless preventive measures are taken. If LOG detects that it is running under DOS 3.1 or later, it preserves the extended error information stemming from EXEC, by obtaining it with function 59h and performing its file I/O calls. It then restores the error information with function 5Dh. Extended error information passed back from the EXEC of DOS 3.0 or earlier is unavoidably lost.

REENTRANCY CONSIDERATIONS

One of the complexities in dealing with EXEC is that in versions of DOS before Version 3.0, a call to EXEC could return with all registers except CS and IP destroyed. LOG saves all remaining registers

except SS and SP on the stack, then stores SS and SP in the code segment. On return, the two stack registers are restored and the values that were pushed onto the stack before the EXEC call was made are popped off into their respective registers.

Caution must be observed here for obvious reasons. Register values can't be popped off the stack until after SS and SP are reset. Easy enough. But we can't just designate a single memory location for SS and SP and set them aside there. Since EXEC calls can be nested several levels deep, the subroutine DOSINT in the LOG source code (which intercepts calls to EXEC) must be written to be entirely reenterable.

Reentrancy requirements dictate that any value that must be preserved and is unique from call to call must be assigned a unique storage address. Thus, two arrays of ten words each are set aside for SS and SP. As in the table of program names, the current level number is used to calculate an



offset into these arrays. If successive values of SS and SP were allowed to overwrite each other, LOG would bring the system to its knees the first time you shelled out to DOS and tried to return or ran a program that EXECed another program.

High-level-language compilers ease the burden of writing reentrant or recursive subroutines by allocating local storage space on the stack each time the subroutine is called. Assemblers do nothing of the sort. Programmers writing in assembly language must implement this or comparable logic by themselves.

FULLY QUALIFIED FILENAMES

Since LOG is a TSR, one of its tasks during initialization is to convert any user-supplied *filespec* for the log file into a fully qualified filename. The term "fully qualified" means that the filename is prefaced with an unambiguous drive specification and pathname that give it the same mean-

ing to DOS no matter what disk and directory are currently being used.

The procedure GENSPEC is called to generate a fully qualified filename from a filespec that may or may not be fully qualified. GENSPEC also supplies the default USAGE.LOG filename if none was supplied by the user. GENSPEC then tests the drive and pathname it generates to make sure the filespec is valid and sets the carry flag accordingly just before it terminates. "Carry clear" on return means a valid filename was created; "carry set" means the input filespec was invalid.

The process of generating a fully qualified filename is not trivial. The logic flow goes something like this: The current drive and directory are obtained from DOS and saved. If a drive specification wasn't given in the filespec, the default drive is requested from DOS and added to it; if one is given, the default drive is set as such. The path portion of the input string is extracted, the current directory is set to the one designation.

nated, and a full pathname is obtained from DOS through function 47h. Then the original drive and directory defaults are restored. For a more comprehensive discussion of this task, see Ray Duncan's Power Programming column "Keeping Filenames Fully Qualified" in the July, 1988, issue of *PC Magazine*.

For all its programming complexities, you'll find LOG to be a convenient and unobtrusive aid in keeping track of your computer usage. It is more suited to hard disk systems than machines equipped only with diskette drives, because it needs to access the log file every time a program is run and terminated. But at this stage in PC history, if you don't own a hard disk, you really should consider investing in one. The increase in productivity, to say nothing of the convenience, will more than offset the cost.

Jeff Prosise is a contributing editor of PC Magazine.

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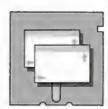
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THE MOUSE: NOT JUST FOR WIMPS



Pointing devices aren't simply a concession to the Mac. They are part of a coherent approach to multitasking and reflect a recognition of the need for a graphics-centered user interface.

T've recently had a number of discussions on PC MagNet about the advent of the OS/2 Presentation Manager. I discovered that much of the opposition to environments like the Presentation Manager is focused on the mouse. And I must admit surprise at the number of passionate mouse-haters out there.

You're probably familiar with many of the objections. Some of them are valid; others are rather silly. Among the silly objections I would include: there's never any room on the desk for a mouse, it gets buried under papers, and so forth. (It's funny that there's always room for the keyboard—a much larger input device—and the keyboard never gets buried.) A more substantial objection, of course, is that using the mouse requires moving one of your hands away from the keyboard. Yet, touch-typists often have the same objection to function keys and cursor keys.

But I get the impression that many PC users feel—at least subconsciously—that the mouse is for wimps. In short, real computer users don't use mice.

Although the mouse was invented at Xerox by Doug Engelbart for decidedly unwimpy systems, the device has come to be closely identified with the Apple Macintosh. That may be the core of the problem. Certainly there have been some interesting and powerful application programs developed for the Mac, but many PC users still regard it as a toy. The IBM PC is viewed as a real computer because its operating system and applications are difficult to learn. It takes guts and perseverance and—most of all—a lot of typing. There is

something vaguely revolting about copying files from one disk to another using only the mouse.

I understand this attitude because I've been there myself. But I've come to like the mouse, and I now recognize its importance to the future evolution of the PC. How will you recognize the Presentation Manager power users of the next decade? By the little critter on their desks.

RECOMMENDED, NOT REQUIRED

Of course, if you really don't want to use a mouse with the OS/2 Presentation Manager, you don't have to. The Presentation Manager gives you freedom of choice. All the standard user interface objects (such as menus, dialog boxes, buttons, and so forth) have a keyboard interface as well as a mouse interface.

When Apple originally designed the Macintosh, it could afford to make some very radical design decisions because the

■ The PM gives you freedom of choice. All the standard user interface objects have a keyboard interface as well as a mouse interface.

operating environment and hardware (including the mouse) were bundled into one package. The original Mac keyboard did not have cursor keys, and the mouse was required for many system functions. (The more recent Mac keyboards, however, have cursor keys, indicating Apple's sensible recognition that the best design is often one that gives users flexibility.)

The situation with the OS/2 Presentation Manager is quite different. This is an operating system and environment that is designed for existing hardware. Unlike the PS/2s, the PC AT and XT Model 286 (both of which can run the Presentation Manager) do not have built-in mouse ports, and IBM does not even sell a mouse for these earlier machines.

Programmers who develop applications for *Microsoft Windows* have taken a cue from the environment itself and often provide a full keyboard interface that allows their programs to be used without a mouse. (For some applications, however, such as CAD and desktop publishing varieties—this becomes awkward and unfeasible, so these programs often require a mouse for full functionality.) I suspect that many of the Presentation Manager programs will be similarly designed.

Light pens, joy sticks, and track balls are all alternatives to the mouse; they can be used with the Presentation Manager if a device driver is available. I suspect that ergonomic considerations of mouse use will someday indicate that the pointing device should be part of the keyboard itself. I hate to suggest that IBM redesign the keyboard yet again, but that may be required.

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But I would rather not get into a discussion of mouse ergonomics here. Let's examine instead why a pointing device is useful in an environment like the Presentation Manager, and why it is therefore, nearly inevitable.

THE MOUSE AND MULTITASKING What? you ask. What on earth does the

What? you ask. What on earth does the mouse have to do with multitasking?

A lot, actually. To examine the relationship between the mouse and multitasking, let's think about the different ways that a multitasking environment on a personal computer can allow a user to run multiple programs and switch among them. I think of these facilities as the user interfaces to multitasking.

Perhaps the most primitive approach is submitted background processing. This is supported under OS/2 1.0 and later with the DETACH command. If you run a program from the CMD. EXE prompt and precede the command line with the word DETACH, the prompt will return immediately and the program will run in the background. Generally, you first redirect program output to a file and then look at the file when the program is finished.

The DETACH command is a fairly traditional facility. In the days when I programmed in PLI on an IBM 370 from a 3278 terminal, I used a similar command called SUBMIT. Under Unix, you run a program in the background by following the command line with an ampersand (&).

We can call this the "delegation" metaphor. You're essentially telling the computer, "Do this job. Don't ask me any questions about it. Just do it. I'll look at the results when you're done." While background processing is fine for some jobs (like compiling), it's not a general solution because it eliminates interaction between the user and the program. As applications have become more interactive, submitted background processing has become much less useful.

More useful to many users than background processing is "context switching," the ability to switch from one program to another without ending the first program. Under DOS, the most familiar context-switching method is pressing a hotkey that invokes a RAM-resident popup. This is not multitasking in the strict

sense, since the program underneath the pop-up is suspended while the pop-up is active. However, because the pop-up uses a hardware interrupt (the keyboard) to interrupt one program and switch to itself, it certainly employs some multitasking techniques. As you know, pop-ups under DOS have many problems, mostly because DOS offers virtually no support for them.

In one sense, pop-ups are actually an extremely crude implementation of a windowing environment. They are crude because when the pop-up is displayed, you can't switch to the program underneath the pop-up. Despite the fact that the underlying program is still visible on the screen, you must make the pop-up go away before

■ The windowing environment encompasses all the other multitasking user interfaces and gives the user the most flexibility.

the program becomes active again.

This constraint gets worse if—as is sometimes the case—you invoke pop-up over pop-up. To switch from one pop-up to another, you have to back up through the pop-ups, making each one disappear in the reverse order you invoked them. You should be able to simply switch from one pop-up to another, but this would obviously require some sophisticated screen management that supports pop-up windows.

Another user interface to multitasking implements the "virtual terminal" metaphor. This approach gives you the illusion of having several PCs on your desk and moving from one to another. Virtual terminals are supported under OS/2 1.0 and later and also under some 80386-based operating systems that make use of the 80386's virtual-86 mode to multitask DOS programs.

Under OS/2, you can have multiple

"sessions" (sometimes called screen groups), each of which runs a full-screen program. You can flip through these sessions using the Alt-Esc key combination. Or you can use Ctrl-Esc to bring up the session manager that lists all the sessions. You then use the keyboard (or mouse) to select one.

I think anyone who has used OS/2 1.0 for some period of time will agree both that running multiple sessions is very convenient but that it can become somewhat confusing and difficult. Often what you want is the ability to merge two sessions in such a way that they appear side by side on the same screen.

For that, we move to the "desktop" metaphor implemented in the OS/2 Presentation Manager. In the Presentation Manager, multiple programs run in windows on the same screen in the same session. (Of course, OS/2 1.1 still supports multiple sessions as well.)

I see windowing environments such as the Presentation Manager as the optimum user interfaces to multitasking. The windowing environment encompasses all the other multitasking user interfaces and gives the user the most flexibility. If you want to run a program full-screen, you simply "maximize" the window. If you want to look at two programs side by side, you adjust the window sizes and position the windows appropriately. If you want to run a program in the background and look at the results later, you "minimize" the program so it appears as a small icon at the bottom of the screen. Like pop-ups, these minimized programs are ready for use at

When you run multiple programs in windows under the Presentation Manager, only one program can be directly interacting with the user. This is called the "active" program or the window with the "input focus." That window occupies the foreground of the display.

So now the question arises, How do you switch control from one window to another?

One way is to use the same keystrokes you use to switch among sessions under OS/2 1.0. You can use Alt-Esc to paddle your way through all the programs. Ctrl-Esc invokes the Task Manager, which lists all the currently running programs. Then

you can use the cursor keys to select the one you want.

But in many cases when you want to switch from one program to another, you can see the desired program's window or icon on the screen. If the screen could respond to your fingers, you wouldn't use the keyboard at all. You would point at the program, as if to say "I want that one," just like ordering something at a sushi bar.

With a mouse, that's exactly what you do. When you click on a window, the window becomes active and moves to the foreground of the display. If the program is running as an icon at the bottom of the screen, you use a double-click (two clicks in quick succession) and the icon expands to a window.

Suppose you want to switch to another program and select an item on that program's menu. Using the keyboard, you must first switch to the program and then select the menu item (using Alt and a letter key, or Alt and the cursor keys). With the mouse, this becomes one operation. You simply click on the menu of the inactive program. The program becomes active and the menu item is invoked.

If you prefer using the keyboard to do these things, that's fine. But when everything is laid out on a screen in various windows, pointing is more natural. You can't point with the keyboard.

And that's why the mouse is such a powerful accessory in a multitasking windowing environment. It provides an easier, faster, and more natural way to switch among programs.

INTERACTIVE INTIMACY Just as the user's interface to multitasking has evolved over the years, application programs have also evolved to become more interactive. Some of us can remember when an "input device" was a punched card reader and an "output device" was a stack of green paper. We've come a long way since those days.

The most primitive type of interactive computer medium is the teletype terminal. With teletype input and output, the keyboard provides a stream of characters and the output device (whether paper or a CRT) displays a stream of characters. A mouse makes no sense in such an environment. In fact, cursor keys don't even make sense. The cursor shows only where the next character will be displayed (which is right after the last character displayed). The only possible nonforward cursor movement is the backspace.

Only in a full-screen character mode environment does a set of cursor movement keys become necessary for moving the cursor around the screen and for performing other tasks.

Yet interaction has progressed beyond the point where the keyboard is adequate. To examine this, let's look at the implementation of one simple operation-changing the width of a columnunder three generations of spreadsheet programs.

In a well-designed program, a mouse can become an extension of your fingers. You can touch, pick up, and stretch objects on the screen.

The first spreadsheet program was Visi-Calc. To change the column width in Visi-Calc, you selected a command from the menu and then typed in the numeric column width. Of course, this often required that you count how many columns you needed. Even then you might have had to adjust the column width several times before you got it just right.

In the most popular second-generation spreadsheet program (Lotus 1-2-3), user interaction has been enhanced. Not only can you type in a numeric value, but you can also use the Left and Right Arrow keys to decrease and increase the column width. This second approach is nice: you get immediate feedback as 1-2-3 changes the width of the column, and you can more quickly adjust it to the width you want.

In a third-generation spreadsheet program (Microsoft Excel), you don't even need to invoke a menu option to change the column width. Instead, you simply reach

up to the screen, take hold of the line separating the columns, and physically move it. Of course, you don't do this with your fingers. You do it with the mouse.

In a well-designed program, a mouse can become an extension of your fingers. You can touch, push, pick up, move, and stretch objects on the screen. The mouse gives you a more intimate relationship with the visual interface of the program, and hence, a more intimate interaction with the program itself.

Scroll bars are a handy visual device best suited to a mouse. They're most often used for applications that store a document (such as a word processing document or a spreadsheet) in memory and display only a portion of it in the window. The scroll bar slider indicates the approximate location of the portion in the window within the whole document.

Often the keyboard cursor keys duplicate some scroll-bar functions, such as scrolling one line or one page. But with the mouse you can also move to a particular location in the document. For example, if you want to move to the middle of your word processing document, you use the mouse to pull the slider to the center of the scroll bar. This is much faster than repeatedly using the PgUp or PgDn keys until you reach the middle.

THE MOUSE AND GRAPHICS The OS/2 Presentation Manager is a graphical environment. There are a number of reasons for this.

The most obvious reason is that a windowing environment must accommodate both programs that use graphics and programs that display only plain-vanilla text. A graphics environment can handle both; a character-mode environment cannot.

The second reason may seem superficial, but it really isn't. Character-mode windowing environments are just plain ugly and don't make efficient use of screen real estate. For example, the various linedrawing characters are often used to draw boundaries around character-mode windows. But there's no way to have different colors on the two sides of the boundary line. Moreover, the horizontal line-drawing characters take up a whole character row rather than just one pixel.

The major objection to graphics, of



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course, is the speed degradation. The problem cannot be ignored, but I think it is only temporary. The next few years should see some major advancements in video adapter technology that will virtually eliminate the speed problem.

A graphical environment and a mouse get along together very well. Not only does the mouse work better in a graphics mode, but graphics applications benefit from the mouse.

Using a mouse in character mode is nearly intolerable because the mouse pointer moves in a very jerky manner as it

■ Graphics-oriented programs often require the specification of precise locations on the screen. With a mouse this is fairly easy.

jumps among discrete character cells. In graphics, the mouse pointer moves smoothly from pixel to pixel.

Graphics-oriented programs (such as CAD or desktop publishing) often require the specification of precise locations on the screen. With the mouse, this is fairly easy. With the keyboard, it's not. Although a program can attempt to emulate a mouse using the cursor movement keys, the results are usually not satisfactory. To obtain the same amount of precision you'd need to move the cursor one pixel per keystroke. Furthermore, even if the program moves the cursor more than one pixel on typematic repeats, it still takes a long time to get the cursor from one side of the screen to the other. In contrast, you can move a mouse pointer very quickly.

Let's face it: the keyboard is essentially a character-mode-input device. When the computer industry graduated from a teletype environment to a full-screen character-mode environment, keyboards had to accommodate this change by including cursor movement keys. The evolution to a

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graphics environment benefits from an additional form of input quite different from the keyboard: the mouse.

THE MOUSE AND MESSAGES In a conventional environment such as DOS or OS/2 1.0, an application program that reads user input from both the keyboard and the mouse must be structured differently from a program that reads only the keyboard.

Many DOS programs that use only the keyboard spend much of their time in the BIOS interrupt 16h function call 0h waiting for a key to be pressed. But if the program also uses a mouse, it can't do this because it will miss mouse input.

The interrupt 33h mouse interface for DOS was first introduced in the Microsoft mouse device driver and was later adopted by other manufacturers of pointing devices. A program can handle both keyboard and mouse input by alternately checking interrupt 16h for keyboard input and interrupt 33h for mouse input. But it can't wait for this input. The program must instead poll the keyboard to see if any key is available. If not, the program then polls the mouse to see if any mouse activity has occurred. If not, then it's back to the keyboard, and so forth. (Michael J. Mefford's FONTEDIT program in the Utilities column of our September 13, 1988, issue shows how this is done.)

This is fine for a DOS program because DOS is a single-tasking environment. But under a multitasking environment such as OS/2, it becomes intolerable. If there is no keyboard or mouse input, the program is still eating up CPU cycles checking for input. This degrades performance in other programs running under the system. Therefore, an OS/2 program must use a different technique to read both keyboard and mouse input.

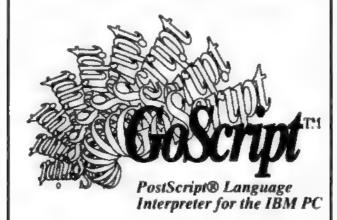
OS/2 has two sets of application program interfaces for the mouse. The first interface is part of the OS/2 kernel and consists of a series of functions with the Mou prefix. This interface is for programs running in full-screen sessions and not for the Presentation Manager programs. To avoid the problem of polling for keyboard and mouse input, the program must create a second thread of execution. The program waits for keyboard input in one thread and

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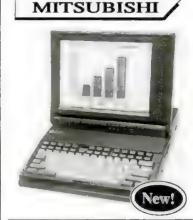
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mouse input in the other.

Of course, the use of multiple threads of execution certainly complicates the structure of a program. It would be much nicer if keyboard and mouse input were delivered to the program through the same interface; that is, the program should be suspended in just one function waiting for any input event. When the program gets the input event, it can then determine whether it represents mouse or keyboard input and process that input appropriately.

In other words, a much better interface for reading both keyboard and mouse input is a messaging system. And guess what?

■ A better interface for reading keyboard and mouse input is a message system, which is the input model for the OS/2

Presentation Manager.

That's the input model on which the OS/2 Presentation Manager is built.

As I've discussed in previous columns, the Presentation Manager stores keyboard and mouse input (along with some other messages) in a message queue. The program retrieves these messages and processes them in a window procedure. Information that accompanies the message tells the program what the message is (that is, whether it represents a keystroke or mouse activity or something else) and other information necessary for the program to process the message (such as the keyboard character itself or the mouse pointer position).

With a messaging system, processing of input from multiple sources becomes a snap.

A COHERENT ENVIRONMENT So we see now that all these characteristics of the OS/2 Presentation Manager—the use of windows for multitasking programs on a single screen, the increased use of inter-

active visual devices such as scroll bars and buttons, the graphics, the messaging system that informs a program of input, and the mouse support—are all connected. Take away any one of these elements and you're left with a weaker-nay, a wimpier-environment.

In the next Environments column, I'll discuss how the OS/2 Presentation Manager programs process mouse messages.



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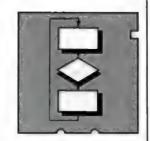
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Masm string and sorting routines



This issue concludes the series on C-equivalent assembler routines by adding case-insensitive search and compare functions and by giving you a MASM Quicksort implementation.

The last two Power Programming columns have been devoted to MASM string functions similar to those found in the C runtime library. My objective has been to provide you with a set of simple building blocks that can be used together for nearly any conceivable string processing requirement in a MASM application. In this issue, we'll finish the series on strings with two more functions, then move on to other matters. A complete list of all these routines, together with the issue in which each appears, is shown in Figure 1.

MASM STRING PACKAGE #3 The listing STRINGS3.ASM (Figure 2) is the source code for our third and last package of string routines. It contains two public routines, STRCMPI and STRNDXI, and one building block routine, STRUPR2. STRUPR2 is meant only for use within the package; it is not a public string routine, and so it cannot be referenced from other modules.

STRCMPI is a case-insensitive string comparison routine with the following parameters:

DS:SI = string1 address
BX = string1 length
ES:DI = string2 address
DX = string2 length

The result of the comparison is determined by the first difference found between the characters in the two strings, with case being ignored for the characters A-Z and a-z. If the first differing character in string1 is less than the character in string2, then string l is less than string2. If the strings are of different lengths but contain identical characters up to the end of the shorter string, then the shorter string is considered less than the longer string. To illustrate,

"ABC" is less than "ABD"
"ABC" is less then "ABCD"
"abc" is equal to "ABC"
"abc" is less than "ABCD"

The results are returned in the CPU's Z (Zero) and S (Sign) flags, as follows:

```
if string1 = string2, S = True
if string1 < string2, S = False and S = True
if string1 > string2, S = False and S = False
```

Thus, after calling STRCMPI to compare two strings, a program can test the results by executing a conditional jump (such as JL, JE, or JG), just as it would do after comparing 2 bytes or words. STRCMPI preserves all registers and the original strings.

STRNDXI is a case-insensitive string search routine. Its arguments are

DS:SI = pattern string address
BX = pattern string length
ES:DI = text string address
DX = text string length

STRNDXI searches the text string for the first occurrence of the complete pattern

MASM String Functions

Function	Description	Module	PC Magazine Issue
STRBRK	Searches for character	STRINGS1.ASM	November 15, 1988
STRCAT	Concatenates strings	STRINGS2.ASM	November 29, 1988
STRCMP	Compares strings (case-sensitive)	STRINGS1.ASM	November 15, 1988
STRCMPI	Compares strings (case-insensitive)	STRINGS3.ASM	December 13, 1988
STRDUP	Duplicates string	STRINGS2.ASM	November 29, 1988
STRLWR	Lowercases string	STRINGS2.ASM	November 29, 1988
STRNDX	Searches string (case-sensitive)	STRINGS1.ASM	November 15, 1988
STRNDXI	Searches string (case-insensitive)	STRINGS3.ASM	December 13, 1988
STRSPN	Validates string	STRINGS1.ASM	November 15, 1988
STRUPR	Uppercases string	STRINGS2.ASM	November 29, 1988
STRXLT	Translates string	STRINGS2.ASM	November 29, 1988
STRXTR	Extracts string	STRINGS2.ASM	November 29, 1988

less than the character in string2, then | Figure 1: The PC Magazine issues in which MASM Power Programming string functions appear.

■ POWER PROGRAMMING

CODYY:	ght (c)	MASM Str 1988 Siff C	ing Package #3 communications Co. * 12-13-88			push call jc	di etzndz endx3	; save offset of dup string to be sear ; mearch upper-cased string ; jump, no match found	ched
		word public	'CODE'			pop	bu bu, di	<pre>p match found, calculate neg- p offeat in duplicate string</pre>	
	extra	etromp:pess	: from STRINGS1			8400	DOC, GI) cries: In ombitoscs activity	
	extrn	etrndx:near	; from STRINGS1	1		pop		; restore registers and	
	extrn	strupr:ness	from STRINGS2	1		pop	da	: let EB:DI = offset of	
	438CHM	COI_TEAT				pop	bp	; match in original string	
STRON	PX1	Case-insens	itive string comparison			dop	di, be		
1						DOD	ei		
Call	with	DS:SI = add	ress of string1 oth of string1	1		bob bob bob	dec		
		ESIDT a add	ress of string?	1		bob	DOK ON		
í		DE - les	gth of string2	1		bob	AK AK		
		_		i i		pop		; return Carry = False	
Setur	100	-	e if stringe are equal			ret		•	
		S - Pal	se if strings are not am	sal, and	andx3:	-	di	: no match found, discard address of d	- 1 4 -
		s - Tri	se if strings are not eque if string2		SBCX1:	pop	62	; no match found, discard address or d : restore registers	n&TTG
1		9 - 7a	se if string1 > string2			pop	da	,	
Unen:		nothing				bob bob bob	bp di.		
OBUS!		uncurud				bob			
	public	atrompi				bob	ei dz		
trompi	broc	DOGE				bob	CR		
	mak	her	; save registers			pop	box		
	push	OE .	1 seas tadinosis			pop	AX.	1 return Carry - True	
	push	dx				ret		1 record carry - true	
	push	81		1	strodni	endp			
	push	di			;			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
	push	46			STRUP	R2:		two strings and translate	
	•				2		the duplica	ates to upper-case	
	call	strupr2	; translate both st	rings to upper case	cell.	with	DEISI - str	ring1 address ring1 length	
	call	atromp	; compare upper-cas	ed strings	1		BE = str	ring1 length	
	pop	98	; restore registers		\$		ESIDI - str	ring2 address	
	000	da	,		3		DX - SC	ring2 length	
	bob bob	di			Retur	13.05 (DE:EX = add	fress of upper-cased string!	
	bob	ds:		1	3		in	temporary storage ringl length	
	pop	OX.			3		BE - etz	ringl length dress of upper-cased string2	
	pop	bx					10 in	temporary storage	
	ret		; return S and S fl	ngs	1		DE - str	temporary storage ring2 length	
trompi	endp				1 Uses:		nothing		
STREET	KI:	Case-insens	itive string search		strepr2		Dear		-
Call (eithe	DEIST a nat	tern address		200000				
		BX m pat	tern leasth			push	de si	; save address and length ; of string!	
		ESIDI = add	tress of string to be sea	robed		push	box box		
		DE = les	igth of string to be sear	ched		push		; get address and length	
 Return	2.00	CY - Try	e if no match			1046.63	di.	of string? for strdup	
- Amount		ES:DI - uno	hanged			push	da		
1		or		1		bob	*1		
		CY = Fal	se if match, and inter to match for patter			pop	da		
		ati	ing within searched stri	ng					
				•		call	strupr de	; dup string2 and translate to upper-c ; save address and length	488
Uses		nothing				push	ei	of string2 copy	
	public	strudni				push	bac		
tradui	MCOC NO.	SCINGEL.				pop	dx di.		
	•					pop	## 47		
	push	AX	; save registers			pop	box	; restore address and	
	push	DK DK				pop	md.	; length of string1	
	push	dz				pop	do		
	push	ai di				call	strupr	; dup string1 and translate to upper-o	
	push	di				Tat	T-co-caller	return to caller	
	push	da da							
	push	ds es			strupr2	endp			
					TEXT	ends			
	call	strupr2	; translate both st						

Figure 2: STRINGS3.ASM is the source code for the case-insensitive string search and comparison routines.

string, so the pattern string should always be shorter than the text string. Case is ignored for the characters A-Z and a-z, so all of the following cases would find a match:

```
pattern = "def", text string = "ABCDEFGHI"
pattern = "DEF", text string = "ABCDEFGHI"
pattern = "DEF", text string = "abcdefghi"
```

If no match is found, STRNDXI returns the Carry flag true (1). If there is a match, STRNDXI returns the Carry flag false (0) and ES:DI points to the first character of the matching sequence within the string being searched. Both the registers (other than ES:DI) and the original strings are unchanged.

The building block routine STRUPR2, which is called by both STRCMPI and STRNDXI, "duplicates" the two argument strings and then folds the lowercase characters in both strings to uppercase ones. STRNDXI and STRCMPI then need only call the original STRCMP and STRNDX routines (in STRINGSI.ASM) and pass the results back to the original caller. Of course, because of the overhead involved in character copying and translat-

ing, STRCMPI and STRNDXI are many times slower than their case-sensitive counterparts STRCMP and STRNDX.

Warning: in its present form, STRUPR2 calls STRDUP (from STRINGS2.ASM) to make the string duplicates. This means that the longest string STRCMPI and STRNDXI can handle is governed by the size of the ring buffer in STRINGS2.ASM. (STRCMP and STRNDX, which search or compare strings in place, do not share this limitation.) If you need to compare or search

strings longer than 255 bytes, you should modify the buffer size in STRINGS2 .ASM or rewrite STRUPR2 to allocate its own memory by calling MS-DOS interrupt 21h function 48h.

I hope that study of STRCMPI and STRNDXI will help to convince you of the benefits of modular, structured MASM programming. Three columns ago, you might have found the idea of writing a case-insensitive string compare or string search routine that left the original strings unaltered a tiresome and messy assignment. As you can now see, however, once the proper building blocks are in place the job is almost trivial. We already have casesensitive compare and search routines. string duplication, and string translation routines in hand, each of which is small enough to be easily comprehended, so it becomes a simple problem of putting them together in the right order.

STRINGS3.ASM DEMO The program TRYSTR3 in Figure 3 demonstrates the use of the STRCMPI and STRNDXI routines. It prompts you for two strings, compares and searches them, and displays the results. To terminate the demo program, just press Enter alone in response to the "Enter string 1" prompt, or press Ctrl-C or Ctrl-Break at any time.

In order to build TRYSTR3.EXE, you need the files listed below. Refer to Figure 1 for the issues in which they are to be found. Put all these files in the same directory and enter the following commands to assemble and link them:

HASM /Si STRINGS; HASM /Si STRINGS2; HASM /Si STRINGS2; HASM /Si IYOU; HASM /SI TRISTR3; LIHK /CO TRYSTR3+STRINGS1+STRINGS2+STRINGS3+ITOH;

If you don't want to trace through the demo program with CodeView, you can omit the /Zi and /CO switches. If you prefer to automate the process of creating TRYSTR3.EXE, you can use the Make file shown in Figure 4.

Because the STRCMPI and STRNDXI routines have quite different uses, you should concentrate on one at a time when using the demo program and ignore the results returned for the other one. It takes a fairly unusual pair of strings to get useful information from both functions at the same time!

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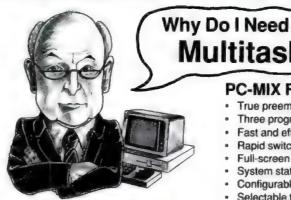
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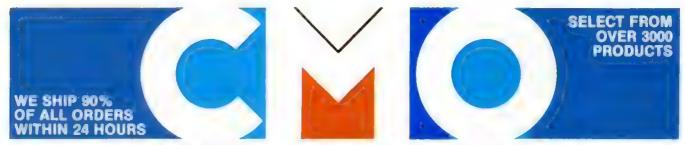
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POWER PROGRAMMING

REVISITING QUICKSORT In the Power Programming columns of September 13 and 27, 1988, I discussed the Quicksort algorithm and presented simple C and MASM implementations that sorted arrays of integers. I also mentioned the powerful C runtime library function qsort (. . . .), a "sorting engine" that can work on arrays of any kind of data given a suitable comparison function. I will not rehash how Quicksort and

qsort (. . .) work here; please refer to the previous columns for details.

QSORT.ASM, shown in Figure 5, is a similar sorting engine for use in MASM programs. It sorts arrays of any kind of data in place, providing you supply an appropriate comparison routine. Its parameters are

```
DS:SI = address of first array element
DS:DI = address of last array element
AK = length of each array element in bytes
ES:BX = address of comparison routine
```

QSORT returns all registers without changing them.

The comparison routine is entered by a far call from QSORT, so it must be declared in your application program with proc far. QSORT passes it the following parameters:

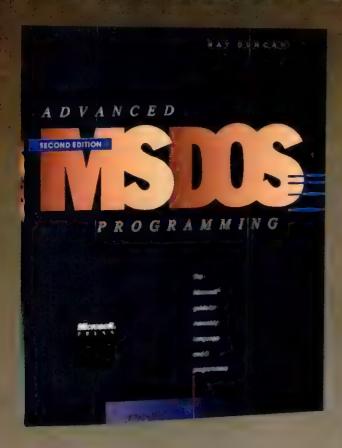
```
DS:SI = address of 1st item to compare
ES:DI = address of 2nd item to compare
CX = length to compare
```

The comparison routine must return regis-

```
hx, stdout ; standard output handle
sh,46h ; function 46h = write
21h ; transfer to NS-DOS
dx,offeet DGROUP:str2; address of buffer
cx,54
bx,stdin ; standard input handle
sh,36h ; function 3fh = read
21h ; transfer to NS-DOS
   TRISTR3.AEN --- MASH String Package #3 Dem
Copyright (c) 1988 Hiff Communications Co.
PC Hagasine * Ray Duncan * 12-13-88
                                                                                                                                                                            mov
int
                                                                      ASCII carriage return
ASCII line feed
                                                                  ; standard input handle
; standard output handle
; standard error handle
stdin
                                                                                                                                                                                             ax,2
s2len,ax
                                                                                                                                                                                                                              ; save string length
                                 DATA
                group
                                                                                                                                                                                            si,offset str1 ; compare the strings
bx,s1len
di,offset str2
dx,s2len
strcmpi
                segment word public 'DATA'
 DATA
                                                                  string 1 buffer
string 2 buffer
stri
stri
                                                                                                                                                                                            sflag
mag3c,al
                                                                  ; string 1 length : string 2 length
silen
                dw
dw
                                                                                                                                                                            call
                                                                                                                                                                                                                               ; format $ and $ ; flags for output
s2len
                                                                                                                                                                                            sflag
meg3d, al
                                                                                                                                                                            call
                db
                                 or, lf, lf, "Enter string 1: "
megi len equ
                                                                                                                                                                                             si,offset strl ; search string 2
                                                                                                                                                                            mov
                db
                                 or, lf, "Enter string 2: "
                                                                                                                                                                                                                                 for string 1
                                                                                                                                                                                             bx,silen
di,offset str2
                8888
                                 cr,lf, "String 1 at: "
"????H",cr,lf, "String 2 at: "
"????H",cr,lf,lf, "STRCMP1: 8="
meg3a
meg3b
meg3c
meg3d
meg3d
meg3f
                                                                                                                                                                            call
mov
                                                                                                                                                                                            oflag
mag3e,al
                                                                                                                                                                                                                              ; format CY flag
; for output
                                  "?",cr,lf,"STRMDXI: CY-"
"? DI-"
                1444
                                                                                                                                                                                            ax,di ; format string 2
bx,offset mag3f ; pointer for output
itoh
mag3 le
                                                                                                                                                                            mov
call
                                                                                                                                                                                                                              ; display results...
rmsgl ; address of mess;
; length of message
; standard output handle
; function 45h = write
; transfer to MS-DOS
                ends
DATA
                                                                                                                                                                                            dx,offset DGMOUP
cx,msg3_len
bx,stdout
ah,48h
21h
                                word public 'cook'
strompi:near
strndmi:near
itoh:near
 TEXT
                 extra
                                 ce: TEXT, de: DGROUP
                                                                                                                                                                                             main1
                                                                                                                                                                                                                              ; get more strings
main
                PEOC
                                                                                                                                                             main
                                                                      make our data segment addressable...
                                                                                                                                                                                                                             ; check state of Sero flag
; return AL = '7' or 'T'
                                                                                                                                                            sflag
                                                                                                                                                                            DESC
                                                                                                                                                                                             Distant.
                                 GS, AX
                                                                                                                                                                                             al, "F"
sflagi
al, "I"
                                                                                                                                                                            jnx
                                                                      format string 1
buffer address
for output
                                                                                                                                                            zflagl: ret
                                ax,offset str2 ; format string 2
bx,offset mag3b ; buffer address
itoh ; for output
dx,offset DGROUP:msq1; address of message
ox,msq1 len ; length of message
bx,stdout ; standard output handle
ab,48h ; function 48h = write
21b ; transfer to NS-DGS
; def first string...
                                                                                                                                                            zflag
                BOY
                                                                                                                                                            eflag
                                                                                                                                                                                                                              ; check state of Sign flag
                                                                                                                                                                            proc
                                                                                                                                                                                             DOSE
main1:
                                                                                                                                                                                            al, "F"
oflagi
al, "T"
                                                                                                                                                            sflagl: ret
                                                                                                                                                            aflag
                                dx, offset DGROVP:strl; address of buffer ox, 54 bx, stdin ; standard input handle ah, 3fh ; function 3fh = reed 21h. ; transfer to MS-DOS
                                                                                                                                                            oflag
                                                                                                                                                                                             DOAL
                                                                                                                                                                                                                                 check state of Carry flag
return AL = 'F' or 'T'
                                                                                                                                                                                            al, "F"
cflagi
                                                                                                                                                                            jne
                                                                                                                                                           oflagl: ret
                                                                  ; anything entered?
; save string length
                                 ex,2
                                                                                                                                                            cflag
                                 main2
                                                                  ; jump if something entered
                jas
                                                                                                                                                            TEXT
                                 ax, 4c#fh
21h
                                                                  ; exit if empty line; transfer to MS-DOS
                int
                                                                                                                                                            STACK
                                                                                                                                                                                            para stack 'STACK'
128 dup (7)
                                                                  j transfer to ME-DOS
; display prompt for string 2...
P:msq2 ; address of message
; length of message
main2:
                                                                                                                                                            STACK
                                 dx,offset DGROUP:m
cx,msg2_len ;
```

Figure 3: TRYSTR3. ASM provides an interactive demonstration of the routines contained in Figure 2.

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ters DS:SI and ES:DI unchanged, though it may destroy registers AX and CX without causing any problems for QSORT. The result of the compare operation must be returned to QSORT in the Z and S flags

```
with the following arguments:

if item 1 = item 2, S = True

if item 1 < item 2, S = Palse and S = True

if item 1 > item 2, E = Palse and S = False
```

QSORT is recursive and makes heavy use

of the stack. It requires at least 24 bytes for each invocation (possibly more depending on the compare routine supplied by the caller), and it may easily recurse to a depth of eight or ten calls when sorting reason-

```
strings1.obj: strings1.asm
masm /Si strings2.asm
masm /Si strings2.asm
masm /Si strings2.asm
masm /Si strings2;

strings3.obj: strings3.asm
masm /Si strings3.asm
masm /Si strings3.obj strings3.asm
masm /Si string
```

Figure 4: A Make file for creating the TRYSTR2.EXE demonstration program.

```
; while(j > i)
; (do until pointers cross)
   QSORT.ASM --- General Purpose QuickSort
Copyright (c) 1988 % Siff Communications Co.
PC Magazine * Ray Duncan * 12-13-88
                                                                                                                                                                                                                                    ; sr = i, pr = j, ax = right
                               DS:SI = address of first item to sort
DS:DI = address of last item to sort
ES:BX = address of compare routine
AX = length of each item
                                                                                                                                                                                                                                    ; undo the last exchange
                                                                                                                                                                                                   bx,di
cx,itemeis
exch
                                                                                                                                                                                                                                   ; SI = i, DI = right, BK = j
                                                                                                                                                                                                                                   ; put partitioning element into position
   Returner
                               nothing
                                                                                                                                                                                   push
                                                                                                                                                                                                   si
   Usest
                                aothing
   The external compare routine must be declared as 'proc far' and it must accept the following parameters:

DBIRT = Address of ist item to compare

CR = Identity to compare

It must return DBIRT and REMOT unchanged and the result of the comparison in the CFU flags as follows:

I = T if item i = item 2

I = T, S = T if item i = item 2

I = T, S = T if item i = item 2
                                                                                                                                                                                                   di, si
di, itemsis
si, left
                                                                                                                                                                                                                                   : geort(left, i-1)
                                                                                                                                                                                   mov
sub
                                                                                                                                                                                   les
mov
call
                                                                                                                                                                                                    bx, compare
                                                                                                                                                                                                   si
ei,itemeis
di,right
bx,compare
ax,itemeis
                                                                                                                                                                                                                                    ; qmort(i+1, right)
                                                                                                                                                                                   mov
les
              segment word public 'CODE' assume cs: TEXT, ds:HOTHING, es:HOTHING | stack variables equ dword ptr | stack variables equ | bp-1 | first item to sort | cqu | bp-1 | first item to sort |
TEXT
                                                                                                                                                                                                   dx
di
si
ax
bx
es
                                                                                                                                                                                                                                    : restore registers
                                                                 ; make visible to Linker
geort
                                di,si
                                                                                                                                                                   gsort5: ret
                                                                                                                                                                   quort
                push
                                bp
bp,ep
                                                                 ; set up stack frame ; and local variables
                                                                                                                                                                      EXCII:
                                                                                                                                                                                                    exchange two items
                push
push
push
push
                                                                ; save address of ; compare routine
                                                                                                                                                                                                  DB:SI = address of first item
DB:DI = address of second item
CK = item length
                                                                                                                                                                      call with:
                                                                    save bytes par ites
offset first item
offset last item
                                                                                                                                                                      Beturner
                                                                                                                                                                                                    nothing
                                                                 ; save remaining registers
                                                                                                                                                                      Uses:
                                                                                                                                                                                                    AX, CE
                                                                                                                                                                                   proc
                push
                                                                 ; make data addressable by ; ES for exchange routine
                                da
ee
                sub
                                                                s = 1 = 1eft - 1

9 Df = right

1 Ex = j = right

1 partition array on value of rightmost item

1 scan right for item >= partitioning value

1 i++
                                                                 ; st = i = left - i
                                ei.itemeis
                                                                                                                                                                                                                                     ; items are words,
; exchange them quickly
quort1:
                add
mov
call
jl
zchg
                               si,itemsiz
cx,itemsiz
compare
quort2
bx,si
                                                                                                                                                                   exch1:
                                                                                                                                                                                                                                    ; save addresses
                                                                                                                                                                                   push
                                                                 ; while(items(i) < items(right))

; SI = j, EX = i, DI = right
; scan left for item <- partitioning value
; j--
; while(items[j] > items[right]
; && (j > left)

                                                                                                                                                                                                    al,[di]
al,[si]
[di],al
                                                                                                                                                                   exch2:
                                                                                                                                                                                                                                       exchange items
byte by byte
                                si,itemsiz
si,left
                jna
jna
                                quort4
cx,itemsiz
                mov
call
                                                                                                                                                                                                                                    ; restore addresses
                                                                 ; st = j, bt = i, ax = right
 geort4: mchq
                                bx,di
                                cx, itemsis
                call
                                                                 : exchange the items
                                                                                                                                                                    TEXT
                                                                 ; SI = i, DI = j, BX = right; SI = i, DI = right, BX = i
```

Figure 5: Given an appropriate comparison routine, QSORT.ASM sorts arrays of data using the Quicksort algorithm.

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ably large arrays. Your application program should therefore have a stack of no less than 4K to provide for a margin of safety.

A DEMONSTRATION OF OSORT

The program TRYQSORT.ASM (Figure 6) illustrates the use of the QSORT.ASM sorting engine. TRYQSORT prompts you for as many as 25 items, calls QSORT to put them in order, and displays the sorted list. Again, the program may be terminat-

ed by pressing Enter alone at the first prompt or by hitting Ctrl-C or Ćtrl-Break at any time.

TRYQSORT is really two demonstration programs in one. It can process either strings or integers; you select which by setting the equates STRINGS and SINGLES to TRUE or FALSE at the beginning of the source file. Needless to say, both should not be set to TRUE at the same time! Conditional assembly statements throughout the remainder of the source file cause generation of the appropriate code for the type of data you wish to enter, sort, and display. The routines COMPS (compare strings) and COMPI (compare integers) provide examples that will show how to write comparison routines that can be called by OSORT.

To build the TRYQSORT.EXE demonstration program, you will need the following files: TRYQSORT.ASM (Figure 6), QSORT.ASM (Figure 5), ATOI.ASM (from Power Programming, February 16,

Copyri	ORT.ASM	1988 Wiff Communi	of MASH Quicksort cations Co.		mov shl	bx.1	put data into array (item number * 2)
		Ray Duncan * 12-1	13-88		mov andif	word ptr [bx+ites	1,4X ;
rue	equ	1					
alse	edin		t two equates control the demo type		12	strings	if strings version
ingles	000	true ; set tru	to two squares control the demo type		MOA	aw,iwi dw,itemeis	for entered string
trings	equ	false set tru	me for integer demo, false for string demo		imul.	da da	for entered string
er rode	agu	, , , ,	- 101 Perling Gend, terms for throught demo		DOV	dx, ax	
tdin	60%		standard input handle		add	dy offeet items	DG:DX = array address
tdout		1 1	standard output handle		MOV	cx, itemais	CX - max input length
tderr	egu	2	standard error handle		BOY	bx.atdin	BX = handle
		- ,			BOV		Fan 3FE - read
E f	edn	edh ;	ASCII carriage return ASCII line feed		int	21h	transfer to MS-DOS
-			10011 1100 1001		сжр	ax,2	was anything entered?
	1.5	atrings			30	main3	empty line, exit
temmiz	endif	88 ;	bytes per string item		endif		
temaix	if	singles	h-t (-t (t		inc	word ptr ix1	count items stored
	equ endif	. :	bytes per integer item		_	seemed when first - 1	and don't exceed maximum
					jne	word ptr ix1,n_it	get another entry
items	equ.	25	max items to sort	main3:	3 main		empty line entered
-	-			and and it	OWD	word ntr ist #	empty line entered eny data in array?
TEXT	segment	word public 'CODE	t'		je	me int	no. inst exit
	as sums	CHI_TEXT, dai_DATA			,-		otherwise sort data
	extra	itominear			307	si.offeet items	DS:SI = first item
	extra	atoirmear			MOV	ax,ix1	DS:DI = lest item
	extra	quortinear			dec	ax .	
ain	proc	Dear			2007	di,itemsis	
	P-00				inul	di an	
	WOY	ax,_DATA ;	make our data segment		add	di,ax di,si	
	MOV	ds, ax	addressable		BOY	bx, TEXT	ES:BX = address of
	cld		string ops safety first		BOY		compare routine
sin1:		1	begin entry of data		if	singles	combare routine
	BOV	word ptr ix1,8 ;	initialise array index		MOV	hx.offset compi	
	push		force ES = data segment		andif		
	pop	**			1.2	strings	
					WOW	bx,offset compe	
	YOR	di,offeet items ;	initialize data array		endif		
	XOL	cx, (n_items*items	111		BOY	ax, itemsiz	AX - bytes per item
	rep stor				call	qsort ;	call QuickSort
	140 2001		display "Enter xxx to sort"				display sorted data initialize array index
	mov	dx, offset msql ;	DS:DX = message address		MOV	word per 182,0	display "Here are the sorted xxx"
	MOV	cx.megi len :	CX - message length		MOY	dx.offset msg2	DS:DX = message address
	mov	bx.stdout :	BX = handle		BOY	CR, mag2 len :	CX = message length
	MOV	ah, 48h ;	Fmn 46H = write		mov		BX = handle
	int	21h ;	transfer to MN-DOS		BOY	ah, 46h	Fxn 488 e write
in2:			convert item number to ASCII string		int	21h	transfer to MS-DOS
	mov		1-based item number	main4:	3		display part item
	inc	he offeet mode .	address for string				display next item convert item number to ASCII string
	call	bx,offset msg3a ;	address for string convert it		BOY	ex,ix2 ;	1-based item number
	OWLL	Daniel 1	display item number		inc	ax	
	mov	dx,offset mag3 ;	D6:DX = message address		HOV	bx,offset meg3a ;	address for string
	MOV	cx.meq3 len	CX = length		call	BZdac ;	convert it
	MOV		BX = handle				
	mov	ah, 40h	Fmh 49H = write		-	do -444 1	display item number
	int	21h	transfer to MS-DOS		NOV	dx,offset msg3 ; cx,msg3 len ;	DS:DE = message address CE = message length
	if	singles ;	if integers version		BOY	bx, stdout	EX = handle
			read keyboard entry		BOY	ah, 48h	Pan 46E - write
	BOY	dx, offset ibuff ;	DE:DX = input buffer		int	21h	transfer to MS-DOS
	BOV	ax, 80 j	CX = mex input length				
	MOV		Ex = handle		if		if integers version
	mov int	ah,3fh ;	Fxn 3FH = read transfer to HE-DOS		BOY	bu,ix2	calc. array offset
					shl mov	bx,1 ax,word ptr [bx+i	and get data
	ie ie	ax,2 ; main3 ;	was anything entered? empty line, exit			,	
	,-		empty line, exit				convert data to ASCII
	BOY	mi.offmat ibuff	convert input to		BOY	CX,18	use base 10
	call	atoi	binary in req. Ax		BOY	#1,offset obuff ;	address for string

Figure 6: TRYQSORT.ASM provides an interactive demonstration of the QSORT sorting engine. The COMPS (compare strings) and COMPI (compare integers) routines provide a model for suitable string and integer comparison routines, respectively.

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1988), and ITOA.ASM (February 29, 1988).

You must put all these files together in the same directory and enter the following series of commands:

```
MASM /Zi ATOI;
MASM /Zi ITOA;
MASM /Zi QSORT;
MASM /Zi TRYQSORT;
LINK /CO TRYQSORT+QSORT+ITOA+ATOI;
```

Alternately, you can use the Make file that is shown in Figure 7 below to automate the process of building the executable pro-

gram, TRYQSORT.EXE.

I recommend that you test your understanding of the QSORT routine by modifying the TRYQSORT demonstration program for double-precision integers. You will need to add a new equate, called DOUBLES, at the beginning of the TRYQSORT source file, appropriate conditional assembly statements, calls to ATOL (February 16, 1988) and LTOA (February 29, 1988) to convert input strings to binary double-precision integers and back again, and a COMPD routine that

QSORT can call to compare two doubleprecision numbers.

Once you have worked through this interactive demonstration exercise successfully, you should be able to apply QSORT to any of your future sorting needs.

THE IN-BOX Please send your comments and suggestions to me at any of the following e-mail addresses:

PC MagNet: 72241,52

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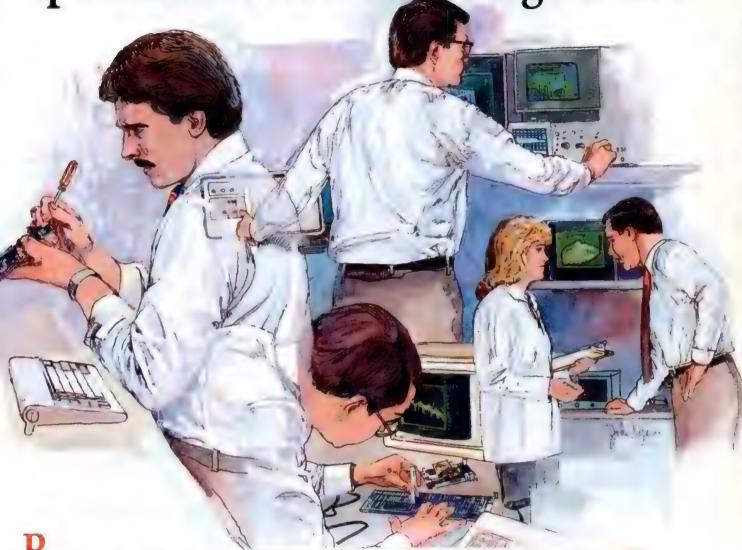
BIX: rduncan

PC

```
convert it
        call
                                                                                               12
                                                                                                        strings
                                                                                                                          : compare two strings
                                                                                               proc
                                                                                                        far
                                     display integer
CX = string length
                                                                                                                            call with DG: #1 - string 1
                  OX, AX
                                                                                                                                       BB:DI = string 2
        MOV
                 dx,si
                                     DE:DX = string addr.
                 bx, stdout
ab, 49h
                                     ar = handle
        BOT
                                                                                               push
                                      Pan 488 - write
                                                                                               push
                                                                                                        41
                                     transfer to MS-DOS
        int
                                                                                                                          : compare strings
        andif
                                                                                                                          ; restore registers
        if
                                   ; if strings version
                 etrings
                                                                                                                          ; returns result in flags
                                     calculate array addr.
        207
                                     DS:DX = array element
                 dx.itemsis
                 dx, offset items
        add
                                     scan for string and
        puch
                                                                                       TEXT
                                                                                               segment word public 'DATA'
                 di, dx
                                                                                       DATA
        BOT
                 CX,-1
                 al, al
                                                                                                        or, lf, lf
        MOE
                                                                                      megi
        repns scaab
                                                                                               12
                                                                                                        singles
                                                                                                         Enter numbers to sert...
                                      CE = length without
                 CX
                                            CR and LF
                                                                                               endif
                 bx, stdout
                                      BE = handle
                                                                                               1.5
                 ah, 48h
                                     Fun 48H = write
                                                                                               ھە
                                                                                                        'Enter strings to sort...'
                                                                                               endif
        int
                                     transfer to MS-DOS
                                                                                                        or, lf
        endif
                                                                                      megi_len egn $
                 word ptr ix2 ex,ix2
        inc
                                    ; advance through array
                                    ; done with array yet?
                                                                                               db
        BOV
                 ax,ix1
        cmp
jne
                                                                                               12
                                                                                                        singles
                                     no, display another
                                                                                               ďΦ
                                                                                                         Bere are the sorted numbers ....
                                                                                               endif
                 mainl
                                    ; restart user entry
                                                                                               if
                  ax, 4095h
                                    : final exit to MG-DOS
main5:
        MOT
                                                                                                         'Here are the sorted strings...'
         int
                                                                                               endif
                                                                                               db
        endo
main
                                                                                      msg2_len equ $-msg2
  convert binary value 6-99 to decimal ASCII chars.
                                                                                                        or,lf,'Item '
 call with AL - binary data, BX - addr. for 2 chars.
                                                                                                         ME I
                                                                                      meg3_len equ (-meg3
        DEGG
                                                                                      ibuff
                                                                                                                          ; keyboard input buffer
                                                                                                                          ; output conversion buffer
siz) dup (6) ; holds data to sort
; number of items in array
                                    ; divide AL by 18, leaving
                                                                                      obuff
         8.886
                                    ; All-quotient, Al-remainder
                  ax, 1861
                                    : convert to ASCII
                                                                                      ixi
                                    ; store ten's digit
                                                                                                                          array output pointer
                                    ; store one's digit
                                    ; return to caller
                                                                                       DATA
                                                                                                       para stack 'STRCK'
4896 dup (?)
b2dec
                                    ; compare two integers
; call with DS:SI = int 1
compi proc
                  far
                                                 ES:DI = int 2
                  ax,[si]
        BOY
                  ax,[di]
                                                 CX
                                                       = length
                                    ; returns result in flags
compi
                                                                                                                                                         (Figure 6 ends)
```

Figure 7: A Make file for producing the TRYQSORT.EXE demonstration program.

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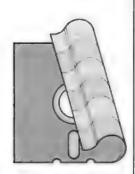
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■ DOUGLAS COBB AND STEVEN COBB

SPREADSHEET CLINIC



Locate misspaced labels in 1-2-3; alter the date format of your Framework worksheet; return to 1-2-3 from DOS using a batch file; delete leading zeros from values in 1-2-3 worksheets.

Entering the date in ddmmyy format into the current cell of your *Framework* worksheet

As a military user of Framework, I need to represent dates in military format (ddmmyy). Unfortunately, Framework does not have a function that displays dates in this way. So I developed a library macro that, when invoked, enters the date in military form where the cursor/cell pointer is positioned within the current document. For example, if the current date is June 15, 1988, Framework will type 15 June 1988 when you invoke this macro.

To build this macro, create a new Empty/Word frame. While the border of the frame is highlighted, assign this frame the name {Alt-D}. Next, press F2 to access the formula area of the frame, type the formula

and hit Enter. Finally, move the formulacontaining frame into the Macros subframe of your Library frame.

Since the frame that contains this macro is named {Alt-D}, you can invoke this

macro simply by typing D while depressing the Alt key.

The first line of the formula enters one or two digits for the current date. The second line types a single space character. The third types the full name of the current month, plus a space character. The last call types the four-character representation of the current year.—John Friedson; APO, New York

The most interesting part of this macro is that it extracts the full name of the current month from the beginning of the result of the @date4(@today) function. This portion of the formula is complex because Framework lacks a function to return the location of a substring within a string.

In Lotus 1-2-3, Symphony, and Quattro, you could use the macro shown in Figure 1 to enter the string form of the current date in military form. Cell B1 of this macro contains the statement

B1: {Let NEXT, +*'*&STRING(@DAY(@NOM), 8)&" "& @CHOOSE(@MONTH(@NOM), "", "January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December")&"*&STRING {1968+GYEAR(@NOM), 8}}

When you invoke this macro, 1-2-3 places the result of the second argument of the {Let} statement (the military form of the current date, prefaced by a 'character) into

the cell named NEXT (B2). Since cell B2 is the next cell in the macro, *1-2-3* then types its contents into the cell on which the cell pointer is positioned at the time.

Stripping leading zeros from worksheet entries in *Lotus 1-2-3*

1-2-3 always places a zero to the left of the decimal point of positive values that are less than 1 and negative values that are greater than -1. For example, if you type .123 into a cell and press Enter, 1-2-3 will display that value as 0.123. Similarly, if you enter the value -.123, 1-2-3 will display it as -0.123.

Since the sales people in our company found this irritating, I developed a way to suppress the display of this character. I operated upon each value with a formula such as

@REPEAT(" ",9-@LENGTH(@STRING(cell,digits)))
&@IT(@LEFT(@STRING(cell,digits),2)="-0",
@REPLACE(@STRING(cell,digits),6,2," -"),
@IF(@LEFT(@STRING(cell,digits),1)="0",
@REPLACE(@STRING(cell,digits),8,1," "),
@STRING(cell,digits)))

where "cell" is the cell's address that contains the value upon which you want the formula to operate, and "digits" is the number of digits that you want to appear to the right of the decimal point. The result of this formula is the string form of the value upon which the formula operates, stripped of a leading 0 and padded with spaces so that it is aligned with the right edge of its cell. This formula assumes that the cell into which you enter it is nine spaces wide, which is a cell's default value in 1-2-3.

Cell A1 of the worksheet shown in Fig-

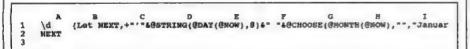


Figure 1: This macro enters the label form of the current date in ddmmyy format into the current cell of a 1-2-3, Symphony, or Quattro worksheet.

■ SPREADSHEET CLINIC

ure 2 contains the value .123. As you can see, 1-2-3 displays this value as 0.123. The formula

```
B1: @REPEAT(" ",9-@LENGTH(@STRING(A1,3)))
L@IF(@LEFT(@STRING(A1,3),0,2," -"),
@REPLACE(@STRING(A1,3),0,2," -"),
@IF(@LEFT(@STRING(A1,3),1)="0",
@REPLACE(@STRING(A1,3),0,1," "),
@STRING(A1,3)))
```

in cell B1 strips the leading zero from this value. Specifically, it returns the string (shown here in quotes) ". 123" (note the five leading spaces). Because column B is nine spaces wide, the number 3 is aligned with the right edge of cell B1.

The first part of this formula returns five space characters—the number required to align the rightmost character in the formula's result with the right edge of a nine-space-wide cell. The second call returns the string ".123"—the string form of the value in cell A1, stripped of its leading 0, with three digits to the right of the decimal point. Concatenating this string to the series of spaces produced by the first part of the formula produces the nine-character string ".123".

Cells B2..B3 contain similar formulas that act upon the values in cells A2..A3. As you can see, these formulas correctly convert negative values, such as the one in cell A2. For values that do not have a leading zero, such as the one in cell A3, these formulas return the string form of the original value, with three digits to the right of the decimal place.—Richard Ruiz; Toronto, Ontario, Canada

These formulas work well in cells that are nine spaces wide (the default for a 1-2-3 worksheet). However, the results of these formulas will not be aligned with the right edge of the cells if those cells have a width other than nine spaces. To make sure that the results of these formulas will be aligned with the right edge of the cells that contain them, no matter how wide those

		•	
	· A	В	C
1	0.123	.123	
2	-0.123	123	
3	123.000	123.000	
4			

Figure 2: The formulas in cells B1..B3 of this worksheet strip the leading zeros from the values displayed in cells A1..A3.

cells are, replace the first part of the second argument of the @REPEAT function (the value 9) with the function

@CELL("width", (cell2)

where cell2 is the address of the cell in the column into which you are entering the formula. Preferably, this should be the address of a cell other than the one into which you are entering the formula. Otherwise, a circular reference will result.

Productivity Tip

To begin executing a 1-2-3 macro starting in the current cell, invoke the macro {Dispatch @CELLPOINTER("address")}. The single command in this macro instructs 1-2-3 to branch to the cell over which the cell pointer is positioned at the time.

Returning to 1-2-3 from DOS using a batch file

In the April 26, 1988, Spreadsheet Clinic column, Michael Kran and others described different ways to keep the message "(Type Exit and press [RETURN] to return to 1-2-3)" on the screen after using the /System command in order to access DOS from within 1-2-3. Although interesting and clever, these methods are more complex than they need to be.

Presumably, the reason for keeping this message on the screen is to prevent a user from loading the program on top of itself by inadvertently typing 123 instead of Exit. I prevent this from happening by changing the name of the file 123.COM to ABC.COM using DOS's RENAME command. Then, in the same directory that contains my 1-2-3 files, I create a batch file named 123.BAT that contains the following commands:

exit abc

To create this batch file, I make the directory that holds my 1-2-3 files the current directory and enter these commands:

COPY CON 123.BAT exit abc^z

Enter Ctrl-Z (^Z) by holding down the Ctrl key and tapping Z. Then press Return again to complete the creation of the file.

Once you have created this batch file, you can load 1-2-3 as you normally would: make current the directory that contains your 1-2-3 program files, type 123, and then press the Enter key. Instead of reading the file named 123.COM, however, your computer will read the batch file 123.BAT. Since you are at the DOS level, your computer will ignore the first statement in the file. However, the second statement, abc, will call the file ABC. COM, which loads the program.

Now, suppose that after loading 1-2-3 you use the /System command to access DOS. If you type Exit when you are ready to return to 1-2-3, as you should, you will return. If you type 123, however, your computer won't load 1-2-3 on top of itself. Instead, it will execute the batch file named 123.BAT. The first statement in the file, exit, returns you to 1-2-3. The second statement, abc, gets "lost." Consequently, your computer will not reload 1-2-3 automatically after you invoke the /Quit Yes command to exit.—Johnathan Hirst; Brooklyn, New York

If your only concern is to make sure the user doesn't reload 1-2-3 on top of itself, we recommend Mr. Hirst's method over the ones presented in the April 26, 1988, issue. However, if you're not sure that the user will remember that Exit is the command required to return to 1-2-3, then you'll probably want to use one of the methods presented in that issue.

Expanding a 1-2-3 range does not change its reference—but this is not a bug

In your December 22, 1987, issue, Kevin Gaza described the way that 1-2-3 deals with references to single-cell ranges that you expand into multiple-cell ranges. Although Mr. Gaza's description of 1-2-3's behavior is correct, his categorization of that behavior as a bug is not.

Mr. Gaza's concern was with functions that can accept range arguments. If one of these functions references a single-cell named range and you expand that range to

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SPREADSHEET CLINIC

encompass more than one cell, 1-2-3 will not expand the argument of the function. Instead, the function will reference the same single cell it did originally. However, it will do so by address rather than by name. For example, suppose that cell A1 is named TEST and that cell A5 contains the function @COUNT(TEST). If you expand TEST so that it encompasses cells A1..A3, cell A5 will no longer contain the function @COUNT(TEST). Instead, it will contain the function @COUNT(A1).

While this behavior may not be what you would want for most functions, it is essential for maintaining the integrity of formulas in the worksheet. To understand why, suppose that cell A6 in the worksheet described above contained the formula +TEST*5. If 1-2-3 acted as Mr. Gaza would want it to, this formula would become the equivalent of +A1..A3+5, which is a formula that 1-2-3 cannot accept. Of course, the formula actually becomes +A1+5. The only difference between this formula and the original is that this one references cell A1 by address rather than by name. - Lance Lide; Little Rock, Arkansas

We appreciate Mr. Lide's insights into this behavior. It would be nice if 1-2-3 could determine which range references should be expanded and which should not. But that's a lot to ask, even from a software package like 1-2-3.

Find misspaced labels by executing the /Range Labels Right command

More than once I've had to look down a long column of labels to find those that end with one or more trailing spaces. To do this, I used to move the cell pointer down the column one cell at a time. While the cell pointer was on each cell, I'd press the Edit key to bring its label to the Edit line. The position of the cursor on that line indicated whether or not the label contained one or more trailing space characters.

Fortunately, there's an easier way to check for trailing spaces in a column of labels. First, set the width of the column to a few spaces wider than the longest label in the column. Then, issue the /Range Labels Right command, highlight the entries you

want to check, and press Enter. The labels without trailing spaces will now be aligned with the right edge of the column, but the labels with trailing spaces will not.

Similarly, I occasionally need to search a column of right-aligned numeric labels to find entries that were inadvertently entered as values, or vice versa. Formerly, I did this by moving the cell pointer down the column one cell at a time, looking for the absence of a label prefix on the first line of the Control Panel. However, there are faster ways to identify these inappropriate entries.

First, you can decrease the width of the column to one space. When you do this, 1-2-3 displays each of the value entries as a single asterisk. However, one or more letters of each of the label entries will be visible. Alternatively, you can assign a numeric format (like Currency, Scientific, or Percent) to all of the cells in the column. After you do this, the value entries will be displayed in the format you selected but the appearance of the labels will not change.—Richard L. Aitkins; Renton, Washington

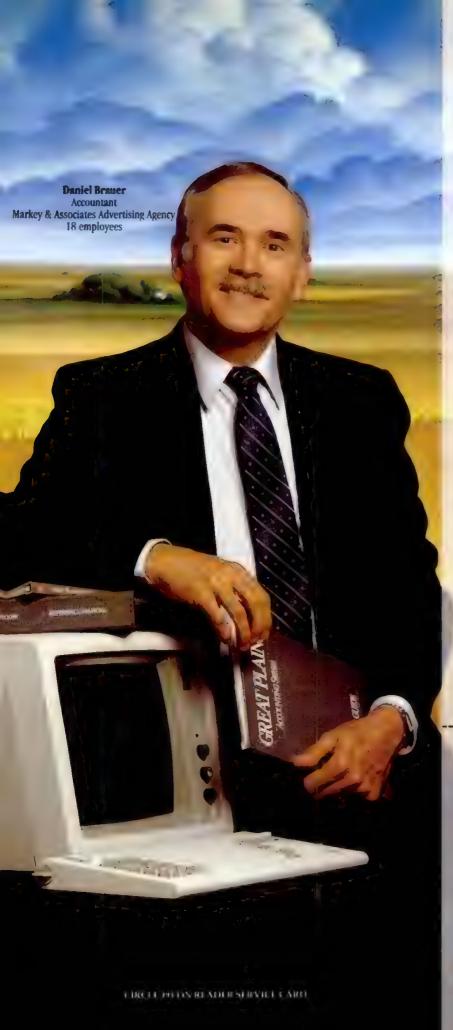
We'll add these to our list of 1-2-3 techniques. As in this case, the most useful 1-2-3 techniques are often the simplest.

Productivity Tip

Password, a \$19.95 utility program from Vericomp Publishing, searches encrypted 1-2-3 and Symphony worksheet files for the password that was used to encrypt them. This program is a must for anyone who has forgotten the password they used to encrypt an important worksheet file. To order a copy of Password, call (619) 277-0400.

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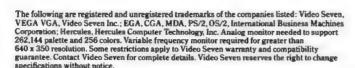
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■ NEIL J. RUBENKING

USER-TO-USER

Perform repeated operations easily by assigning a text string to a single keystroke combination; better your DOS environment and batch files with ANSI.SYS.

Enhance your DOS environment and batch files with ANSLSYS

The earliest computer monitors were little more than electronic teletype machines. And, just like a teletype, they'd print one character at a time until the end of the line, then advance to the start of the next line. In this age of pop-up windows and pull-down menus, that teletype action seems primitive, but it's the way most DOS commands and many utilities work.

Later video terminals added control codes. These codes move the cursor, erase areas of the screen, and generally control the display. You can add this kind of control to your batch files and DOS environment using ANSI.SYS.

Before you try to install ANSI.SYS, make sure it is in the root directory of your boot disk. Then add this line to your CON-FIG.SYS file:

DEVICE=ANSI.SYS

Now reboot your computer. You won't notice any immediate difference, but AN-SI.SYS is at your command.

GIVING ORDERS TO ANSI To send ANSI.SYS a message, you write an escape sequence to standard output. An escape sequence is a coded string of characters beginning with ASCII character 27, the Esc character. Here we run into a problem: it's difficult to ECHO the Esc character. Yet, to experiment with ANSI.SYS you need an easy way to send it messages. To this end I'm providing ANSI.COM.

This tiny program accepts a character string on its command line, replaces every tilde (*) character with an Esc, and writes it to standard output. For example,

AMSI [2] clears the screen
AMSI [8] homes the cursor
AMSI [41;33;1m sets yellow text on red
background

To create ANSI.COM, type in ANSI.SCR as shown in Figure 1 using any editor that can generate flat ASCII files. TED, a small, full-screen editor in *PC Magazine*'s November 15, 1988, Utilities, is ideal for this purpose. Make sure you include the blank lines after the RET instruction and after the final Q. With DEBUG

N ANSI.COM A 100 MOV SI,0082 MOV CL,[SI-02] JCXZ 0117 DEC CX LODSB AL,7E CMP JNZ 0110 MOV AL, 1B XCHG DX, AX MOV AH, 02 TNT 21 LOOP 0109 RET RCX 18 W

Figure 1: This DEBUG script generates ANSI.COM, a tool to communicate with ANSI.SYS.

.COM in the current directory or available on the path, give the command

DEBUG < ANSI.SCR

Watch the output—if you see ^ Error pointing to a line, double-check that line in ANSI.SCR, fix it, and repeat. Try your new ANSI.COM with the examples above or create your own. You can use any ANSI sequence as long as you replace the Esc with a tilde.

ANSI Color Commands

Parameter	Effect			
0	All off low intensity white on black)			
1	High intensity			
4	Underline on (monochrome only)			
5	Blink on	Blink on		
7	Reverse video			
8	Invisible			
Color	Foreground	Background		
Black	30	40		
Red	31	41		
Green	32	42		
Yellow	33	43		
Blue	34	44		
Magenta	35	45		
Cyan	36	46		
	37	47		

Figure 2: ANSI color commands take the form ESC [#; . . . ; #m, where each # represents a number from the list above.

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USER-TO-USER

Commands	
Cursor direction	Code
Backward	ESC[#D
Forward	ESC[#C
Down	ESC[#B
Up	ESC[#A
To row/column	ESC[#:#H
To row/column	ESC[#,#f
Clear screen	ESC[2J
Erase to EOL	ESC[K
Save cursor position	ESC[s
Restore saved position	EŞC[u

Figure 3: The # symbol represents an optional parameter that determines how many times the command will be repeated. For example, ESC [3C moves the cursor forward three characters. It defaults to 1.

You won't find the ANSI commands in your DOS manual unless you're using an old version of DOS. Figures 2 and 3 provide a brief listing of the handiest commands. ANSIBOX.BAT, shown in Figure 4, demonstrates what you can do with these ANSI commands in a batch file. The first ANSI command prints "X marks the spot (X)" and saves the current cursor position. The next three commands write a yellow-on-red box with yellow-on-black text inside it. Then the last line comes back to the previous cursor position, turns off all color attributes, and finishes that line. With ANSI.COM you can beautify all your batch files.

Productivity Tip

When you're entering a lot of numbers on an old-style keypad, it's annoying to have to turn NumLock on and off to switch between the arrow keys and the numeric keypad. Just set NumLock to the state you use most and toggle with Shift.

Productivity Tip

To remove the Ctrl-Z from the end of a text file, use

COPY FILENAME+,,/B

To restore the Ctrl-Z, use

COPY FILENAME+,,

Don't do this to a nontext file, as it will truncate the file at the first Ctrl-Z.

Execute repetitive operations with a single keystroke combination

To perform repeated operations with a single keystroke combination, I created ANSIKEY.BAT shown in Figure 5. To assign a text string to a key combination,

AMSIKEY F# (text of key setting, up to 8 words).

For example,

ANSIKEY F1 CD\DOS\DBASE\DRAWINGS

will set function key F1 to execute

CD\DOS\DBASE\DRAWINGS

when you enter Shift-F1.

To store the key settings, I create ten files, F1.KEY through F10.KEY. List the key assignments stored in these files by using ANSIKEYL.BAT in Figure 6.

The .KEY files must be initialized at startup via ANSIKEYI.BAT, shown in Figure 7, which I execute within AU-

TOEXEC.BAT.

All three batch files-ANSI KEY.BAT, ANSIKEYL.BAT, and ANSIKEYI.BAT—require that AN-SI.SYS be installed. To do this, move AN-

ECHO OFF ANSI X marks the spot (X) [s ANSI ~[5;27H~[41;33;1mr ANSI -[6;27H|-[40m HERE IS TEXT IN A BOX -[41m| ANSI -[7;27H ANSI [u] @m... and here we are back at the spot.

Figure 4: An example of how to use ANSI to beautify batch files.

SI.SYS into your root directory and add this line to your CONFIG.SYS:

DEVICE=ANSI.SYS

Within ANSIKEY.BAT, I use ANSI .COM to send the appropriate command to ANSI.SYS. For function keys F1 through F10, I send the scan codes 84 through 93.

This same technique could be used to assign values to other keystroke combinations. I have chosen Shift-F# because it seems to be a key combination that's less used than Alt- or Ctrl-, for example.

This technique saves me a substantial amount of time, and it uses only standard MS-DOS commands.—Patricia Hayes; Port Hope, Ontario, Canada

The submitted ANSIKEY.BAT file relied on the PROMPT command to send key redefinition strings to ANSI.SYS. As a result, it wiped out the existing prompt. To save the prompt, I fixed ANSIKEY so

```
ECHO OFF
IF NOT "%9"=="" GOTO TOOMany
GOTO %1
GOTO ERROR
:F1
ANSI T[0;84;"82 %3 %4 %5 %6 %7 %8";13p
GOTO OK
ANSI ~[0;85;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
:F3
ANSI ~[0;86;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
:F4
ANSI ~[0;87;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
:F5
ANSI ~[0;88;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
ANSI ~[0:89; "%2 %3 %4 %5 %6 %7 %8";13p
GOTO OR
ANSI 7[0;90;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
                                                           (continues)
```

Figure 5: ANSIKEY.BAT makes assigning text strings to keys easy.



USER-TO-USER

```
ANSI [0;91;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
: 179
ANSI ~[0;92;"%2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
:F10
ANSI "[#;93;"$2 %3 %4 %5 %6 %7 %8";13p
GOTO OK
: TooMany
ECHO. Key setting text can contain at most 8 words.
GOTO DONE
: ERROR
ECHO SYNTAX: "ANSIKEY F# [text of key setting, up to 8 words]"
GOTO DONE
2 OK
ECHO %1 %2 %3 %4 %5 %6 %7 %8 > \%1.KEY
: DONE
```

(Figure 5 ends)

ECHO OFF ECHO Key assignments for shifted function keys "COPY ... CON > NUL" hides any "File not found" messages. FOR %%f IN (1 2 3 4 5 6 7 8 9 10) DO COPY \F%%f.KEY CON > NUL

Figure 6: ANSIKEYL.BAT lists the current key assignments made by ANSIKEY.BAT.

it uses the ANSI.COM program instead.

Any command you create with ANSI-KEY will automatically have a carriage return added to it. If you don't want that carriage return, remove the three characters ; 13 from each ANSI command line.

ANSIKEY allows you only to assign text strings to shifted function keys. If you'd like to experiment further, you can use ANSI.COM to create other key reassignments. The syntax is

ESC[#;#; .. #p ESC[#; "string"p ESC[#; "string"; #; "string"p

The first number (#) is the ASCII code of the key you're redefining. If this number is 0, the second number is the extended AS-CII code of the key. The remainder of the command is the character sequence you want to assign to that key. This sequence can contain any number of quoted text strings and ASCII character numbers sepa-

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USER-TO-USER

rated by semicolons. For example,

AMSI "[8:84:"DIR *.COM /W":13:"DIR *.EXE /W":13p

will set the Shift-F1 key to do first a wide directory of .COM files and then a wide directory of .EXE files.

ANSI key reassignments work only in programs that use DOS standard input and

ЕСНО	OFF	
ЕСНО		\F1.KEY
ECHO	F2 >	\F2.KEY
ECHO	F3 >	\F3.KEY
ECHO	F4 >	\F4.KEY
ECHO	F5 >	\F5.KEY
ECHO	F6 >	\F6.KEY
ECHO	F7 >	\F7.KEY
ECHO	F8 >	\F8.KEY
ECHO	F9 >	\F9.KEY
ECHO	F10 :	> \F10.KEY

Figure 7: ANSIKEYI.BAT initializes the .KEY files that track the current key assignments.

output. There aren't many such programs these days, but the DOS command level itself, along with utilities such as DEBUG and EDLIN, are likely places to use them.

Productivity Tip

Here's a quick way to make a file's date and time stamp current. Use

COPY /B FILENAME+,,

This tells DOS to copy the file plus a null file (nothing between the commas) onto the original file. The result is a file whose contents are unchanged—but its date and time stamp is updated.

Productivity Tip

If your computer uses just floppy disks, you can stash your COMMAND.COM

file on a RAMdisk and you'll be able to save yourself some time.

The RAMdisk can be small—64K is plenty of space. In your AUTOEXEC .BAT file, copy COMMAND.COM to the RAMdisk, and add the command

"SET COMSPEC=C:\COMMAND.COM"

(If your RAMdisk isn't C:, substitute the appropriate letter after the equals sign.)

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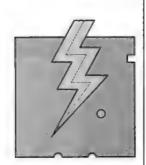
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■ EDITED BY CRAIG L. STARK

POWER USER



Composing documents from previously stored paragraphs in WordPerfect; linking databases in dBASE III reveals a bug; editing and updating Microsoft Word macros easily.

Edit and update Word macros more quickly and easily with these two macros

Here are two macros that will help users of *Microsoft Word*, Version 4.0, edit and manage their macros. The first macro is very simple:

<esc>i<f1>

Type it as shown and then use <Esc>C to copy it to the glossary. I recommend the name (and control code to call it quickly) Mac-List ^<Ctrl-M>L. Mac-List brings up a list of your macros and boilerplate, which is useful in itself, and is called on by the second macro.

The second macro is shown in Figure 1. I recommend you call it Mac-Edit and give it the control sequence ^<Ctrl-M>E. Mac-Edit begins by creating a blank paragraph for macro editing. It then calls up the glossary list and asks you to select the macro to be edited. After you make your selection, Mac-Edit inserts the glossary entry into your text and warns you not to hit the Enter key until you've finished editing. When you hit Enter, the macro highlights the text, calls up the glossary list, and pauses for you to select the macro name to use for the edited macro. Finally, after you have selected a name. Mac-Edit finishes by copying the text to the glossary and deleting the text from your screen.-John Thomas Gillick; Brooklyn, New York

This is somewhat similar in concept to the macro-editing suggestion by James C.

Figure 1: Mac-Edit will help you edit a macro that is already in your Microsoft Word glossary.

Beard (Power User, August 1988). One notable difference is that Mr. Gillick's meta-macro will help you find a poorly remembered name in the glossary and will insert it in the editing screen for you. Another is that while Beard's approach used a second macro to store the macro name and then automatically saved the modified text back to the same name, Gillick's macro waits for you to designate the macro name before saving. Both of these differences are desirable.

You may want to take the first half of Gillick's macro (through the second pause) and add it to the front end of Beard's macro. Or you may want to take just the first two lines of Gillick's macro (up through the insertion of the macro into the text) and use it.—M. David Stone

Beware of dBASE III bug when linking databases

dBASE III users should be aware that whenever SET RELATION is used to link two databases, the DELETED() status of the secondary database is ignored even if SET DELETED is ON.

The following example illustrates the

problem that I am having:

		: OKDEK.GDI	
Field	Field Name	туре	Width
1	CUSTNUM	Character	2
2	ITEM	Character	10
Record	CUSTNUM	ITEM	
	1 10	Hammer	
	2 26	Nails	
Field	Field Name	Character	Width
2	NAME	Character	15
Record	CUSTNUM	NAME	
	1 *10	Deleted Rec	
	2 19	Harry	

In a program where CUST.DBF is indexed on the Custnum field and set into relationship under ORDER.DBF, a listing of Custnum, Item, and CUST->Name fields will yield the deleted record rather than "Harry."

Mary

Records	CUSTNUM	ITEM	CUST->NAME
1	16	Hammer	Deleted Rec
3	20	Nails	Hary

Do you know of any workaround for this problem?—Dave Bartholomew; Oakland, California

Since this example uses the SET DE-LETED ON command, I thought perhaps





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■ POWER USER

the problem could be solved by issuing

SET FILTER TO .NOT. DELETED() instead. But both dBASE III and FoxBASE continued to report the deleted secondary record.

Other than PACKing the secondary file to physically remove all records marked for deletion or writing a longer program that would not use the SET RELATION TO command (and one that would run much more slowly as a result), there is no workaround.

Interestingly, however, Clipper, dBXL, and Quicksilver all correctly ignore the deleted record and produce the proper results when either SET DELETED ON or

SET FILTER TO .NOT. DELETED() is issued.—Brad Stark

A short, quick procedure to center text in dBASE III programs

The short CM (Center Message) procedure shown below is perfect for centering messages or text headings in dBASE III programs:

PROC cm
PARA row, msg
@ row, INT((88-LEN(msg))/2) SAY msg
RETU

To use CM, just include it in your procedure file. Then, when you want a message centered, use this syntax:

DO cm WITH 24, "Center this text"

CM accepts two parameters: the ROW() on which to issue the text, and the message itself. The message can be a text string (as above) or any character-type expression. The centering shown here is based on an 80-character screen width, but CM can center lines for your printer as well; simply adjust the width from 80 to whatever print width you're using.—Ronald Pollitt; Philadelphia, Pennsylvania

This quick Center Message procedure is a great time-saver in any program where appearance matters, and it works with any modern *dBASE*-language application. Naturally, the message must be no wider than the screen or print line you're using. Here are some variations on CM.

As written, CM does not CLEAR the row first, so if other text may already be on-screen, add the command

@ row, @

before issuing the centered text.

To issue the message in a different color so it stands out more, issue a SET COLOR TO command before the message and SET COLOR back to standard afterwards. In fact, the CM procedure I use involves passing a third parameter to specify which color should be set.

With *Clipper*, I use both CM and the following UDF (User Defined Function):

FUNCTION cf
PARA msg
len=INT((8%-LEN(msg))/2)
pad=REPL(" ",len)
RETURN pad+msg+pad

Equipped with both a procedure and a function, you can center text in any programming situation.—Brad Stark

Productivity Tip

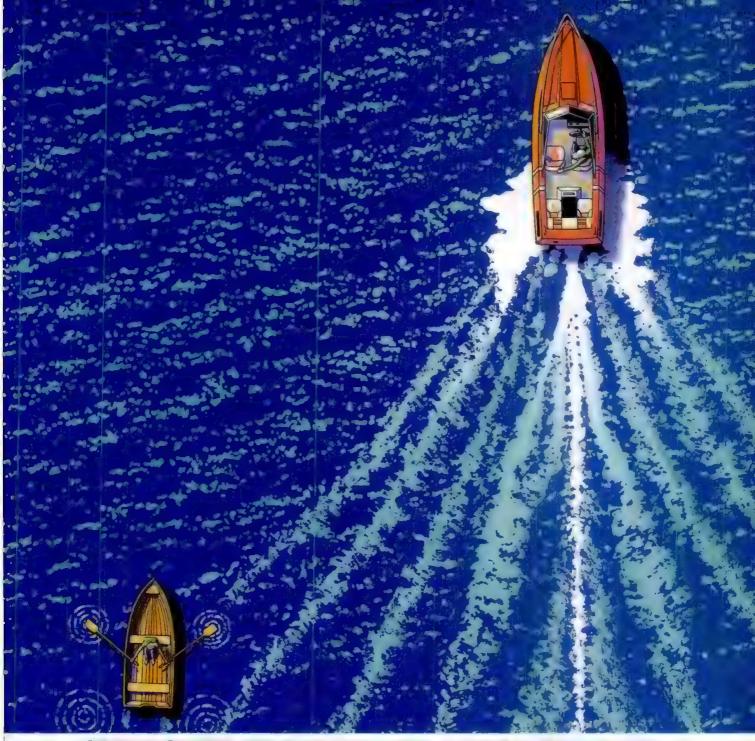
When you are copying or appending large databases in *Clipper*, you can tell how long you will have to wait for it to be completed by using the FUNCTION recasho listed below. The constant monitoring of your progress will cost you about 10 percent in speed, however.

COPY TO <filename> WHILE rec_sho()
FUNC rec sho
IF SUBS(STR(recn(),8),8,1)="@"
@ 24,8 SAY STR(recn(),8)
ENDI
RETU .T.

Assemble documents from paragraphs stored as fields using WordPerfect's merge facility

We needed to be able to include multiple optional paragraphs in our legal documents. By using *WordPerfect*'s merge feature, we were able to include user-selected paragraphs as the merge progressed.

We replaced the field number n in ^Fn^ with ^C, added ^O message ^O, and combined it with ^U to rewrite the screen. Thus, we've come up with a merge that



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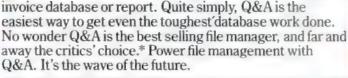
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```
^O <Paragraph $1> ^O This is the text for substitution paragraph number one.

^R
^O <Paragraph $2> ^O PARAGRAPH HEADING:

This is the text for substitution paragraph number two.

^R
^O <Paragraph $3> ^OPARAGRAPH HEADING:

This is the text for substitution paragraph number three.

^E
```

Figure 2: To create a secondary merge file for document assembly, structure it as above.

```
This is a primary document to test merging of optional paragraphs using Nordperfect 4.2 or 5.8.

"U"O 1) Insert Paragraph $1 or 9)SKIP

"O"F"C?"

The above merge allows insertion of a paragraph with option 1 or no substitution with option 9.

"U"O This is a multi-line prompt:
2) Insert Paragraph $2,
3) Insert Paragraph $3,
or 9) SKIP

"O"F"C?"

The above merge allows insertion of either paragraph 2, paragraph 3, or no substitution with option 9.
```

Figure 3: Merge this document with the DOC.SEC file shown above in Figure 2 to see document assembly using the WordPerfect merge feature.

stops, tells you which paragraphs are available, and selects your choice for inclusion in the primary document. Wherever you may need an optional paragraph from your secondary document, include this general form in your primary document:

```
^U^O message 
^O^F^C?^
```

The *message* should include the number and description of each paragraph that might be used at this point. It will appear as a prompt in the primary document when the merge pauses for input, and it will disappear when the merge continues. The question mark (?) stops the insertion of a blank line when you select "no substitution."

WordPerfect displays control characters by putting a caret (^) in front of them, but you actually enter them by pressing Ctrl plus the letter. The very last character in the line is a *real* caret, however: press Shift plus the top-row 6 key.

If the merge behaves strangely or stops, examine the secondary document carefully for improper or missing merge returns (R) or for either too many or missing carriage returns.—Robert Chestnutt and Connie Guhrt; Missoula, Montana

To try out this method in *WordPerfect*, Versions 4.2 or 5.0, type in DOC.SEC | Park Avenue, New York, NY 10016

(Figure 2) and DOC.PRI (Figure 3). Enter the control characters using Ctrl plus the letter, or pick them from the Merge Codes menu, Shift-F9. Now clear your screen and perform the merge, with DOC.PRI as primary file and DOC.SEC as secondary file.

Note that in the primary file you must put a hard return between the end of the message and the 'O that follows it. If you omit the return, the "Field:" prompt will overwrite the message. You can create multiline prompt messages, as well—look at the second prompt in Figure 3.

The number for the SKIP option can be any number larger than the maximum number of fields used. Also, you can insert any paragraph at any prompt—the message simply tells you which paragraphs are appropriate.—Neil J. Rubenking

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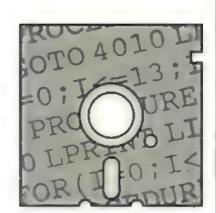
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Finding ASCII text in .EXE or .COM files with Turbo Pascal; saving FORTRAN registers before calling assembler routines; recognizing multiple keystrokes in QuickBASIC.

A QuickBASIC function that recognizes multiple keystrokes

Programs that use PgUp and PgDn can be improved if you can move by more than one page at a time. This is often done by combining PgUp and PgDn with Ctrl to page in higher, fixed increments.

A better alternative to this is to count the number of times that the keys have been pressed while the Ctrl key is held down. This creates keystrokes such as Ctrl-PgUp-PgUp-PgUp, which can be interpreted to mean "Page up three pages." This could also be applied to graphics software that has a zoom capability. If Alt-Z means "Zoom two times," then Alt-Z-Z

could mean "Zoom four times," and Alt-Z-Z-Z could mean "Zoom eight times," and so forth.

FNGetKey\$ is a QuickBASIC function that implements this scheme (Figure 1). It works like INKEY\$, but it returns an extra character containing a repeat count for selected combinations of keystrokes using Ctrl or Alt.—James A. Parsly; Knoxville, Tennessee

As with Inkey\$, you would use the length of the string returned to determine if the key that was pressed was normal, extended, or repeated. Some text editors, such as SideKick, use a similar technique to avoid repeatedly updating the screen. If you press and hold Ctrl-PgUp in SideKick, it

senses that you want to span several screens and waits until you are done. Then, it redraws the screen only once.

This function can be converted to work with Turbo Basic without much effort: Turbo Basic supports calling DOS and BIOS interrupts directly.—Ethan Winer

A better way to copy and delete in Turbo Pascal

Mr. David A. Johns gave examples of some useful programs in the Turbo Power User column, *PC Magazine*, April 14, 1987. His Copy and Delete programs worked well, but I found them inadequate. I've developed versions with runtime error

```
'Works like XMKEYS, but also returns a repeat count for extended keys.
STATIC GetKey$, ScanCodet, Maskt, Countt, InArrayt(1), OutArrayt(1)
MEDIN InArray*(7), Outheray*(7)
GetKey$ = IMREY$ 'get a keystroke
FMGetKey$ = GetKey$ 'set up default return value
IF LEM(GetKey$) <> 2 THEM EXIT DEF 'if sull or normal key, exit
ScanCodet = ASC(RIGHT$(GetKey$, 1)) 'isolate the key's scan code 
'assume it's an Alt-key for now 
'assume no repeats for now
                                                                                              GetKeys - INKEYS
                                                                                              GOTO L1
SELECT CASE ScanCodes
                                 '<Ctrl-F1> through <Ctrl-F10>
   CASE 94 TO 183
   Haskt = 4
CASE 115 TO 119
                                 '<Ctrl-Left>, <Ctrl-Right>, <Ctrl-End>,
                                 '<Ctrl-PgDn>, or <Ctrl-Home>
      Maskt - 4
      Maske = 4
                                 '<Ctrl-PgUp>
                                                                                         L2: Key$ - PREstRey$
   CASE ELSE
'Wait for additional keystrokes until the user either releases the
                                                                                                 CASE 5
'<alt> or <ctrl> key, or hits a different keystroke.
                                                                                                    PRINT Neys:
'Call the BIOS to get the status of the <ALT> and <CTRL> keys.
CALL INT86(6H16, VARPTR(InArray&(8)), VARPTR(OutArray&(8)))
                                                                                              END SELECT
'Check the appropriate bit in the AL register.
IF (Hask's AND OutArrays(#)) - # GOTO Done
                                                                                              GOTO L2
```

```
'Call the BIOS to see if there is a keystroke waiting in the buffer.

Inhrmy*(8) = sHi88

CALL INTSG(SHI6, VARPTR(Inhrmy*(8)), VARPTR(Outhrmy*(8)))

'Check the I flag in the FLAGS register to see if a keystroke is waiting.

IF (Outhrmy*(7) AND 64) = 64 GOTO Li

'Examine AH register to see if keystroke matches the previous scan code.

IF PERK(VARPTR(Outhrmy*(8)) + 1) <> ScanCode* GOTO Done

'Remove the keystroke from the keyboard buffer and increment the count.

GetKeys = INKETS
Count* = Count* + 1

GOTO L1

Done: IF Count* <> 1 THEN FRGetKeys = GetKeys + CHR$(Count*)

END DEF

'Test program for FRGetKeys

L2: Keys = FRGetKeys

IF Keys = " GOTO L2

SELECT CASE LEB(Keys)

CAME 2

PRINT "Scan Code: "; ASC(MID$(Keys, 2));
FRINT "Count: "; ASC(MID$(Keys, 2));
FRINT "Count: "; ASC(MID$(Reys, 2));
FRINT "Count: "; ASC(MID$(Reys, 1));

END SELECT
FRINT
GOTO L2
```

Figure 1: A QuickBASIC function that distinguishes multiple keystrokes.

LANGUAGES

checking and a display of what occurred during their execution. The programs are listed in Figures 2 and 3.

When I want to use one of these programs, I \$Include it at the top of the program I'm working on, for example, {\$IC:\TURBO\COPY.PAS}. Including the program is much cleaner than copying it into my current program and deleting it when done. It's easy to remove the single \$Include line.—Robert Christopher Kobus; Madison, Wisconsin

Clever! Turbo Pascal stops compiling when it reaches a legitimate "END."

statement, even if it's in an \$Include file. Hence you can \$Include a whole program at the top of the program you're working on.—Neil J. Rubenking

Using C filters to put extended characters into WordStar files

Using the IBM box drawing and other extended ASCII characters with WordStar is a nightmare. While WordStar 4.0 moved a step in that direction, most extended ASCII characters are treated as if they were their normal ASCII counterparts. To let

you use any extended ASCII character with WordStar, I wrote WS4XLATE.C, a filter that translates a file containing any extended ASCII character into a document that WordStar 4.0 can use directly or import into an existing document.—Dan Lasley; Cordova, Tennessee

The program WS4XLATE is a typical filter (a number of which have been previously discussed in this column). Filters are excellent tools for learning to program in C and can be used as the basis for hundreds of other programs.

As in most filters, all the characters

```
PROGRAM CODY;
COMET
 Buffire = 16384;
VAR
                        : Byte;
  SccFile, DatFile
                       1 FILE:
  FileHameA, FileHameB : STRING[255];
                      : ARRAY[1..BufSize] OF Byte;
  BacaRead
                        : Integer;
 DiskFull
                        : Boolean;
 PROCEDURE SrcFileError(ioCode : Byte);
  BECIN
   Write(#7, 'I/O result of ', ioCode, ' (decimal) ', #26);
   CASE ioCode OF
     $81 : WriteLn(' Source file not found.');
   $F3 : WriteLn(' Too many files open.');
ELSE WriteLn(' "Reset" unknown I/O error.');
   EMD:
 END:
 PROCEDURE DetFileError(ioCode : Byte);
 REGIN
   Write($7, 'I/O result of ', iocode, ' (decimal) ', $26);
   CASE ioCode OF
     $F# : WriteLn(' Disk data area full.');
      $F1 : WriteLn(' Disk directory full.');
     $F3 : WriteLn(' Too many files open.');
   ELSE WriteLn(' "Newrite" unknown I/O error.');
   END
BEGIN
 Write('Copy from file : ');
 ReadLn(FileHameA):
                To file : ');
 Write:
 ReadIn(FileNameS):
 IF FileNames <> FileNameA THEN
   REGIM
     Assign(SrcFile, PileWameA);
     Assign(DetFile, FileNameB);
      (* Note second parameter in "reset" and "rewrite" of UNtyped files. *)
      ($I~) Reset(SroFile, 1); ($I+)
```

```
ioCode := IOResult:
 IF ioCode <> # THEN STOFILEETTOT(ioCode)
 第1. 章章
   REGIE
     ($I-) Rewrite(DatFile, 1); ($I+)
     ioCode := IOResult;
     IF ioCode <> # THEN DetFileError(ioCode)
         DiskFull :- False:
         WHILE (NOT EOF(SrcFile)) AND (NOT DiskFull) DO
             {* Note fourth parameter in "blockread". *}
             BlockRead(SrcFile, Buffer, BufSize, RecuRead);
                  ioCode := IOReault;
                  IF ioCode <> # THEM
                    REGIN
                      SrcFileError(ioCode);
                      DiskFull := True
                    END
                  ELER
                    BEGIN
                      \{\$I-\}
                      BlockWrite(DetFile, Buffer, RecsRead);
                      ($I+)
                      ioCode := IOMesult:
                      IF inCode <> 6 THEN
                        REGIN
                          DatFileError(ioCode);
                          DiskFull := True
                    THE
                EMD:
              IF NOT DiskFull THEN WriteLn('File copied.')
            END:
         Close(DetFile)
        EDD:
      Close(SrcFile)
 ELSE WriteLn($7, 'File can not be copied onto itself.')
KND.
```

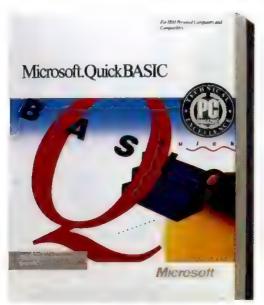
Figure 2: An improved version of the COPY.PAS program with built-in error checking.

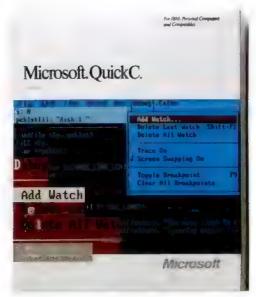
```
ELSE WriteLn('Unknown I/O error.');
PROGRAM Delete;
                                                                      END:
 ioCode : Byte;
 FileVar : FILE;
 FileName : STRING[255];
                                                                      Write('Delete file : ');
                                                                      ReadLn(FileName);
 PROCEDURE idError(idCode : Byte);
                                                                      Assign(FileVar, FileName);
                                                                      ($I-) Erase(FileVar);
                                                                                                   {$I+}
    Write(#7, 'I/O result of ', ioCode, ' (decimal) ', #26, ' ');
                                                                      ioCode := IOResult;
                                                                      IF iocode <> 0 THEN ioError(iocode)
   CASE locode OF
                                                                      ELSE WriteLn('File deleted.')
      $81 : WriteLn('Filename not found.');
      $28 : WriteLn('Illegal operation for a logical device.');
      $F3 : WriteLn('Too many files open.');
```

Figure 3: A better way to delete any file without leaving the Turbo editor.

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To each





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Figure 4: Add support for extended ASCII characters to WordStar 4.0 using this C filter.

pass through the program from input to output. On output, extended ASCII characters are preceded by a 1Bh and followed by a 1Ch. This forces *WordStar* to treat them as extended characters in the text. A simplified version of the WS4XLATE program is shown in Figure 4.

In the main loop, each character is ANDed with 80h (decimal 128, binary 10000000) to isolate the high bit. A bitwise AND will return TRUE if at least one bit that is on in the right value is also on in the left value. Extended characters fall in the range from 128 to 255, so their high bit is always on. And the value 80h was chosen as a mask to check the characters, since only one of its bits is on—the same high bit. Thus, a bitwise AND with 80h will be true only for values in the extended ASCII range.

Since the if statement will be true only for the extended ASCII characters, they will be filtered. Each of the extended AS-CII characters will be written to the output preceded by the LEADIN character and followed by the LEADOUT character. Otherwise the character is passed through the filter and written to the output.—Richard Hale Shaw

Productivity Tip

Save yourself an extra long-distance call to Microsoft's switchboard just to get the number for technical support. You can reach Microsoft's technical support directly at (206) 882-8089.

Productivity Tip

The Turbo Pascal built-in Read procedure was changed between Versions 3 and 4. When you use Read to input a string variable, it does not clear the end-of-input marker. Only a ReadLn does that. In general, use ReadLn for string variables.

A Turbo Pascal filter that finds ASCII text in .EXE or .COM files

Here is a simple Turbo Pascal program, listed in Figure 5, which you can use to find any ASCII text in an .EXE or a .COM file. I use it to see all the messages a program prints to the screen and to look through programs obtained from bulletin boards for any messages that may indicate a "bomb" program (although this is not always a foolproof method).—Michael McGuffey; Huntington, West Virginia

The original program simply printed out every printable character in the source file. I enhanced it a bit to let you choose a minimum length for the strings you'll see. The program puts each string of at least the minimum length on a separate line. If you see "Arf! Arf! Gotcha!" in the output, think twice before running the program. Note that the program doesn't check for

```
($R+)
PROGRAM GetASCII;
                                                                                                                                                                                                END:
                                                                                                                                                                                       P := Succ(Pend);
    buffsise = 16384;
                                                                                                                                                                          ELSE P := Succ(P);
UNTIL (P >= top);
TYPE
BuffType = ARRAY[1..buffsize] OF Char;
    Filvar
Filonamo
                        3 FILE:
                                                                                                                                                                     EGINICAT(ABCII, BixeOf(ABCII), Felse);
FiliChar(ABCII, BixeOf(ABCII), Felse);
FiliChar(ABCII[832], 96, True);
(* Mow for any character CH, ABCII[CH] is true *)
(* only if CH is a charoter from $32 to $127 *)
Write(*Enter minimum string length to check for i ');
                        : Integer;
     Actual
                            Byte;
BuffType;
ARRAY[Char] OF Boolean;
     MinLen
buffer
     buffer
ASCII
     overlap | Byte;
                                                                                                                                                                       ReadLn(MinLen);
Write('Enter name of file to check: ');
     PROCEDURE Check(VAR B : BuffType; top : Integer; VAR OvLap : Byte);
                                                                                                                                                                      Write('Enter name or file
ReadLn(Filename);
Assign(Filvar, Filename);
Reset(Filvar, 1);
WHILE NOT EOF(Filvar) DO
         P := 1;
                                                                                                                                                                       BEGIN
Blockhead(Filvar, buffer, buffsize, Actual);
Check[buffer, Actual, overlap);
(Rack up to get any that "cross" into the next buffer)
IF (Actual = buffsize) ARD (overlap) = 8) THEN
Seek[Filvar, FileOs(Filvar)-overlap);
NOTE: This is a Turbo Fascal 4.8 progras, but you can
convert it for TP1 by Galeting the line above
and replacing it with the line below. *)
             IF ASCII[B[P]] THEN
                 BEGIN
Pend := F;
MEFEAT
                      REFEAT
Pend := Succ(Pend)
Pend := Succ(Pend)
UNTIL (NOT ASCIT[B[Pend]]) OR (Pend = top);
IF ((Pend = top) ASCIT[B[Pend]]) THEM
OVLAP := Succ(Pend-P)
                                                                                                                                                                                          (* LongSeek(FilVar, LongFilePos(FilVar)-overlap); *)
                          IF Succ(Pend-P) >= MinLen THEN
                                                                                                                                                                                    END
                                                                                                                                                                               Close(Filvar);
                                   FOR i := P TO Pred(Pend) DO Write(B[i]);
WriteLn;
                                                                                                                                                                           END.
```

Figure 5: An easy way to find ASCII strings in a .COM or .EXE file.

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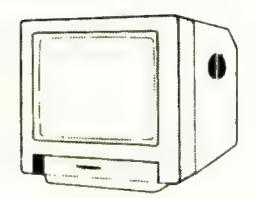
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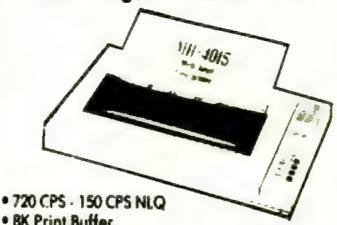
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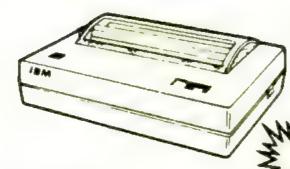
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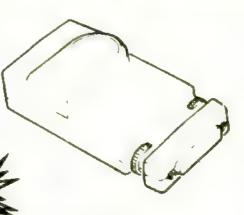
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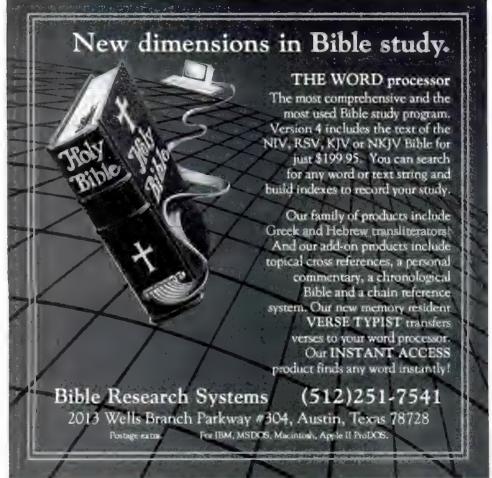


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■ LANGUAGES

existence of the input file—bad filenames will crash it.—Neil J. Rubenking

Registers that should be saved when calling assembler routines from FORTRAN

The FORTRAN manual states that when calling a routine written in assembler, registers SI, DI, SS, and DS should be preserved. But my first experiment with this produced strange results. I eliminated the problem by saving all registers. Then I went back to find out what went wrong.

My investigation revealed that FOR-TRAN assumes that the direction flag will be in the same position before and after a subroutine call. Changing it—from CLD to STD, for example—inside the assembly routine causes problems. To be safe, I now always save and restore the flags with a PUSHF/POPF combination.—Donald E. Haselwood; Clearwater, Florida

The direction flag determines whether the next piece of data used in a block move or compare has a higher or lower address than the current one. This flag comes into play any time a memory move or string copy is performed, so you can easily see why reversing it can cause problems.

Although not widely documented, some functions of the INT 10h video routines in an early version of the IBM PC ROM BIOS destroy the BP register. Since the BP register is used to control the stack environment, altering it unknowingly will usually result in a program crash. So when you are writing assembly routines to enhance FORTRAN's screen output, be sure that you save and restore the BP register as well.—Robert L. Hummel

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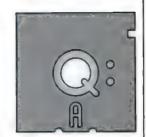
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PC TUTOR



A comprehensive explanation of the archive bit; a way to prevent program crashes from an undocumented bug in the original IBM PC ROM BIOS.

An explanation of what the archive bit is used for in DOS

I know how to set and remove the archive bit and I know how to display if it is on or off. But I have no idea what it's for! There's no clear explanation in my MSDOS 3.2 reference manual, so I'm turning to you for help.

What is the archive bit for?—Jeff Salgo; Anaheim, California

The archive bit, one of several attributes a DOS disk file may possess, is set to *on* by any DOS operation that changes that file. This bit is used to good advantage by back-up programs. These programs usually reset the archive bit to *off* after they have copied the file. Thus, copying only files that have changed since the last backup means copying all files with the archive bit set to on. But not everyone is as familiar with file attributes as Mr. Salgo, so I'll explain some of the basics.

The PC-DOS and OS/2 operating systems use a directory structure to keep track of files stored on-disk. The directory structure itself is stored on the disk and contains a single 32-bit entry for each file on the disk. The structure of a directory entry, and the information stored in it, is shown in Figure 1.

Although stored in a compressed format, most of the fields in the directory entry contain the file information that you see when you use the DOS DIR command: filename, time and date of the last change, and file size in bytes. DOS uses the 16-bit field labeled starting cluster (with the file allocation table, or FAT), to locate the physical position of the file on the surface of the disk. The field labeled reserved is unused in DOS 1.0 through 3.31. However, this field is rumored to be used in future

DOS Directory			
Structu	ire		
0	Name		
0Bh	Attribute		
0Ch	Reserved		
16h	Time		
18h	Date		
1Ah	Starting cluster		
1Ch	File size		

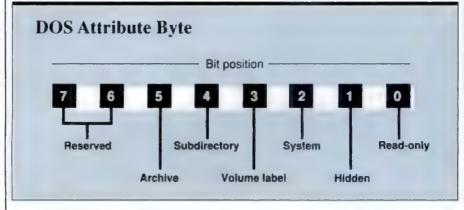
Figure 1: The format of a DOS disk directory entry, and the contents of each field.

releases of DOS and OS/2 to hold additional file information. The remaining field is known as the *attribute byte*.

The attribute byte is not treated as if it contained a single value but is subdivided into eight separate 1-bit fields. Each bit represents a particular characteristic that a file may possess under DOS. The 8 attribute bits and their meanings are shown in Figure 2 below.

Whenever DOS is called upon to read, write, delete, rename, or otherwise work with a file, it examines the attribute byte to determine what actions are permitted. A disk file whose directory entry attribute byte has the read-only bit set, for example, cannot be overwritten or deleted. Hidden and system files will not be included in the list of files generated by the DIR command. If the subdirectory bit is set, the file contains directory information and is for DOS's internal use only.

As I mentioned, whenever a file is



and file size in bytes. DOS uses the 16-bit | Figure 2: Each bit in the attribute byte identifies a single characteristic of the file it describes.



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PC TUTOR

modified by DOS, the archive bit in the attribute byte is turned on (set to 1). This bit is never used by the DOS file system in everyday operations but is provided to backup programs as a "courtesy."

Viewing and changing file attributes can be accomplished in a number of ways. Unfortunately, ATTRIB.EXE, which was introduced in PC-DOS 3.0, cannot be used. This laughable program is written in C (it's about 15K long) and allows only the read-only bit to be turned on and off. Subsequent versions reduced the size somewhat but added no more capability.

(For trivia buffs, the 3.0 and 3.1 AT-TRIB programs bear the name of one of the chief architects of DOS, Mark Zbi-kowski. The 3.2 version has the date December 6, 1984, and the initials "PR." Finally, the name "W Russell Whitehead" appears prominently in Version 3.3.)

A better way to examine and toggle file attributes is to use ATTR.COM, a free utility written by Charles Petzold and published in *PC Magazine*'s June 10, 1986, Programming/Utilities column. This 627-byte program, written in assembler, lets you set and reset any combination of the read-only, hidden, system, and archive bits. ATTR may be obtained via modern from our information service, PC MagNet. Instructions for using this service are given in each issue's Utilities column in the "By Modem" sidebar.

An undocumented bug in the original IBM PC ROM BIOS can cause program crashes

I'm having a serious problem finding anyone who can answer my question. I am developing assembly language routines that will be called from a C program. One of my C programs that uses these functions works great on my IBM-compatible computer. When I tried the same program on true IBM PCs, it worked on two and failed on two others.

I found that the problem occurred during one of my assembly routines that clears the screen. Although my routine successfully cleared the screen and returned control to the C program, the BP register was altered during the INT 10h instruction. The BP register is critical to the calling C

function and causes the program to fail when it attempts to restore the SP register.

None of the information I have indicates any results like this. The obvious solution is to save the BP register. Do I need to do this for every interrupt? Should I save other registers, too? Why don't any other programs I've seen save the BP register for interrupts?—Jonathan Wood; Tustin, California

It's true. IBM goofed when writing the original PC's ROM BIOS. In the prologue to the interrupt 10h handling routine, where a long list of registers is pushed, the BP register is conspicuous by its absence. The Scroll Window functions change the BP register while working. PCs with later versions of the system board BIOS fixed this oversight. (EGA cards also replace this section of the BIOS and remove the problem.)

If the calling program doesn't save and restore the register, the results can be disastrous. High-level languages—C and BASIC, for example—use the BP register as a reference pointer to create a *stack frame* when entering and leaving subroutines. Changing BP corrupts the stack frame and can cause mysterious program crashes.

To ensure that your programs will run on those PCs with the faulty BIOS code, you should save the value of BP on entry and restore it on exit with the PUSH/POP instruction pair. If you use the BP register inside the routine to access parameters on the stack, you'll need to bracket each video call with code like this:

PUSH BP INT 10H POP BP

Copies of the BIOS with this problem are easy to identify by checking their release date. The DEBUG commands used to create a date-checking program are shown in Figure 3. First, you should make sure that the DEBUG program is in your current directory or in a directory specified in your PATH command. Then, start DEBUG and enter each of the commands exactly as shown. Press the Enter key once and only once at the end of each line, including the blank line just after the RET instruction. When the process is complete,



■ PC TUTOR

N BIOSI	DATE.COM
A 100	
MOV	AX,F000
MOV	DS, AX
MOV	SI,FFF5
MOV	CX,8
LODSB	
MOV	AH,E
INT	10
LOOP	10B
INT	20
RCX	
14	
W	
Q	

Figure 3: The DEBUG script for BIOSDATE.COM. Follow the directions in the text to create the program and run it to display the ROM date for your computer.

N VIDEO	FIX.COM
A 100	
JMP	Ø111
PUSH	BP
PUSHF	
CS:	
CALL	FAR [010D]
POP	BP
RETF	0002
DW	Ø
DW	Ø
MOV	AX,3510
INT	21
VOM	[Ø1ØD],BX
MOV	[010F],ES
VOM	AX,2510
MOV	DX,0102
INT	21
MOV	AX,[002C]
MOV	ES, AX
MOV	AH, 49
INT	21
MOV	DX,0012
MOV	AX,3100
INT	21
RCX	
37	
W	
Q	

Figure 4: If you're still using a PC with the original BIOS, the program VIDEOFIX.COM will fix a nasty bug.

BIOSDATE.COM will have been created in the current directory.

Simply run BIOSDATE to display the release date of your computer on the screen. The BIOS date that contains the bug is 04/24/81. If this matches the date on your computer, you can avoid potential problems with a simple memory-resident program. VIDEOFIX intercepts calls to the interrupt 10h video routines and automatically saves the BP register. The DEBUG commands used to create the program are given in Figure 4. Create VIDEOFIX using the same procedure given above for the BIOSDATE program.

The best place to install VIDEOFIX is as the first line in your AUTOEXEC.BAT file. Any programs run after that will have to pass through the patch to get to the BIOS. Don't use this program if you have an EGA or VGA card installed. It's not needed and will interfere with some advanced function calls.

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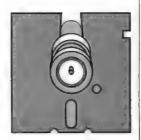
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CONNECTIVITY CLINIC



X.25: a standard for arranging, transmitting, and routing data through switched networks; automate micro-to-mainframe connections with an Application Program Interface.

Automating PC-to-mainframe connections using an API

Here's how I connected PC users to a mainframe database so they have all the power of the PC while the mainframe thinks it is handling only 3270 terminals.

The application is text processing, where all editing and composition is carried out by PC workstations and photocomposition is performed by the mainframe. We also have a mainframe database holding thousands of documents requiring text processing that is done on the PCs.

I wrote a program that takes requests from the workstations and sends them out the LAN gateway computer in a format the mainframe understands. On our Novell LAN, the gateway is a PC that is identical to the text processing PCs, but it also contains a Pathway Designs SNA board and driver software. Pathway provides an API that allows access to screen buffers, status sensing, and sending and receiving by high-level languages such as C and Pascal. This API let me write the application protocols as I needed them while the Pathway drivers handled all the details of SDLC and SNA transmission.

One of my major objectives was to make the application look "native" from each end. That is, the PC operators were not to be concerned with mainframe terminology, such as CICS sign-ons and error codes, and the computer operations staff with the mainframe did not wish to support a non-3270 application.

The application on each PC posts re-

quests for mainframe action to a queue file maintained in a public directory on the LAN file server. My program de-queues each PC request and translates it into a CICS transaction using 3270 Data Stream commands and orders. In addition, the software watches for error conditions and responds like an intelligent user. For instance, if a record is received from the mainframe but is not saved properly on the LAN data files, a CICS transaction is generated back to the mainframe. Finally, our communications program automatically logs on and off CICS and is capable of managing as many as four sessions.

With this system, I saved our investment in mainframe hardware and software but eliminated the need to train PC users on mainframe procedures.—Chet Floyd; Hermosa Beach, California

The 3270 tutorial in the November 29, 1988, issue of *PC Magazine* (see "Puzzling Out the Mainframe Connection: A Tutorial") describes how terminal-emulation software acts on a PC to make the screen and keyboard work as a 3270-series terminal.

This letter shows the value of the Application Program Interface (API) that many companies provide with their 3270 terminal-emulation software. The API description tells what memory locations and registers a DOS application program can use to interact with the emulation program. Interaction includes reading data from the PC's screen, responding to changes in the status of the communications lines, and sending data to the mainframe.

If you use the API creatively, users don't have to know any of the arcane processes of 3270 communications. You can hide the sign-on activities and all the other levels of mainframe interaction behind familiar DOS menu programs, batch files, or the programs you write. Users can request information or actions in terms familiar to them. And your program, working through the API, can translate their requests into a form the mainframe understands.

Since the API lets you create batch files, menus, and programs that hide the mainframe interaction from the user, you can create a program that emulates an expert mainframe user while not bothering the person plugging away on the PC.

Unfortunately, not all APIs are alike. You usually have to learn the techniques and quirks of the specific API available with your terminal-emulation software. IBM created a good interface it calls the High-Level Language Application Programming Interface (HLLAPI), pronounced ha-lop-pee. This interface was provided in the support software for the now defunct IBM 3270 Personal Computer. Many other companies support the HLLAPI interface in their products. IBM recently announced that it will add the HLLAPI interface to the OS/2 Extended Edition but declined to say when.

You can write programs that interface with HLLAPI in assembler, BASIC, C, Pascal, and other languages, but it is a job for programmers who understand both the 3270 communications process and programming with special function calls.

■ CONNECTIVITY CLINIC

Productivity Tip

There are three good products that allow *NetWare* stations to share any printer attached to any PC on the LAN: *LANSpool* from LAN Systems Inc., (212) 431-8484; *ManyLink* from NetLine, (801) 373-6000; and *Hot Server* from Hot Ware, (602) 581-2447.

X.25 services: a data communications standard

When you described how to link LANs across the country in the September 13, 1987, issue's Connectivity Clinic, you told us how to use X.25 services and you provided the names of some companies that supply them. Thank you, but what is X.25 anyway?—David Aiwa; Jackson Hole, Wyoming

Anything that starts with X. or V. and a number is a standard established by the International Telegraph and Telephone Consultative Committee. (In French, its initials are CCITT.) X.25 is a technical standard that describes how to perform several data communications tasks.

At the lowest level, the X.25 standards describe how data is arranged into packets. This job is typically done by a communications processor, sometimes mounted on a PC expansion card, called a packet-assembler-disassembler, or PAD. At the next level, the standard describes how packets are transmitted over a communications line. Often, X.25 transmission is used over a leased line between two computers and only the first two levels of the standard apply to that link. But X.25 also describes how packets are routed through large switched networks, such as Tymnet and other public carriers, as well as private networks like the Defense Department's Digital Data Network. Switched X.25 networks provide economy and redundancy for reliability.

The use of X.25 networks has grown faster in Europe than in the U.S., where the presence of previously established private data networks slowed its adoption. However, using X.25 in the U.S. will become more important as LANs are linked using long-distance-leased lines and public and private switched data networks.

Productivity Tip

See which COM ports are installed on a PC by bringing up DEBUG, typing d 40:0, and reading the first line of the hex dump. A COM1 port is shown by F8 03 in the first and second data columns. COM2 is F8 02 in the third and fourth columns. Zeros or other data mean no ports are installed or there are hardware conflicts.

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New high-performance 3Com server can overrun older EtherLink cards

We recently upgraded from a 3Com 3Server3 to a 3Com 3S401 using an 80386 processor. We like the 3S401, but the high performance of this server creates a problem with our good old EtherLink (3C501) cards. The problem is that 3+Share's default configuration creates SMB (Server Message Block) file I/O messages of 4,096 bytes. (This is defined at the workstation by the /z parameter on the MSRE-DIR line in the AUTOEXEC.BAT file.) But since Ethernet handles frames of about 1,500 bytes, the 386 server is sending multiple Ethernet frames in order to complete one packet. Unfortunately, old 3Com 3C501 network interface cards can be overrun when they have to handle the data from consecutive frames.

The solution is counterintuitive. By reducing the MSREDIR buffer size to something under 1,500 bytes, the 3+Share software will send more SMB packets, but the cards will handle fewer multiframe Ethernet packets.

We see point-to-point performance of around 1.4 megabits per second from an AST Premium 286 with 3C503 network cards connected to the 3S401. This is almost 2½ times the performance of the 3Server3. Also, the performance of AT-class workstations is noticeably better when using the 3C503 and 3S401 compared with the 3Server3 and any other workstation.—Doug Ruby; Waltham, Massachusetts

This is a helpful hint on packet sizes. When I look at the Ethernet traffic with an analyzer, I don't see evidence of our 3C501 cards stumbling over data, but I keep hearing that it happens. Anyone us-

ing this fix should keep in mind that it will have a detrimental impact on the performance of the server and the workstations using the newer Ethernet II (3C503), 3C505, or Micro Channel cards.

Network Your Questions

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Modem ZENITH LAPTOP 286/20 Super Sport 386/40 L.t. Sport PACKARD-BELL 386 System 286 System 8088 System DISC DRIVES SEAGATE 20 Mb Kit SEAGATE 40 Mb SEAGATE 40 Mb SEAGATE 40 Mb SEAGATE 40 Mb Kit	\$3300 \$5800 \$2600 \$1200 \$640 \$259 \$295 \$366
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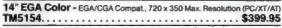
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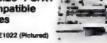
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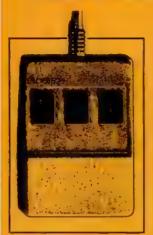
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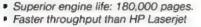
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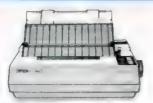
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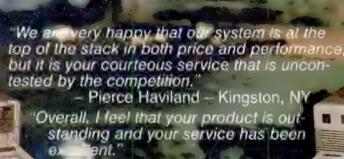
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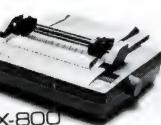
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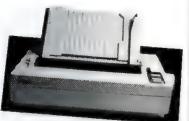
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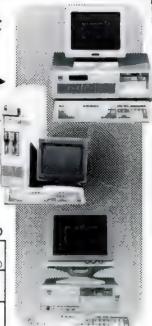
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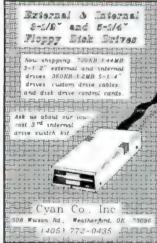
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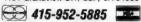
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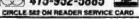
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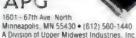
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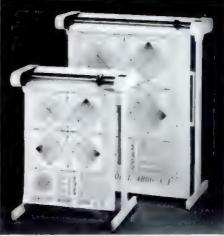
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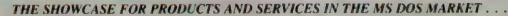


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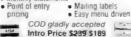
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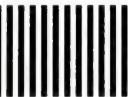
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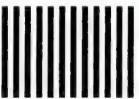


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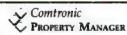
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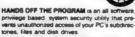
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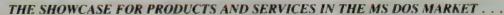
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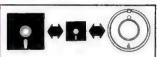
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WHICH BUS IS BEST? First there was the classic AT bus. Then came IBM's Micro Channel architecture. Now we have EISA, the open standard bus from a Compaq-led consortium. EISA offers features similar to those of the Micro Channel, but it does so by expanding on the design of the AT bus, not by replacing it. The MCA and EISA are profiled to help you decide for yourself which bus will set the industry standard down the road.

HIGH-SPEED 286 MACHINES Just how fast can a 286 go? Some predicted that when the 80386 microprocessor was introduced, the 80286 would be put out to pasture. Instead, computer manufacturers are finding ways to squeeze 20-MHz performance out of the 286-based machines. Edward Mendelson reviews six speedy 286s from Dataworld, Dell, Micro 1, Northgate, Vector, and Zeos.

APPLESHARE Frank J. Derfler, Jr., looks at new workgroup products from Apple that help improve the PC-to-Macintosh connection.



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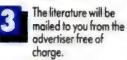
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c. 🗆 Education	products?	u. In 4 to 6 months	Company	
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e. Engineering/R&D	5. Are there any PCs in your	your entire company? x. □ 25 or less	State	insure delivery)
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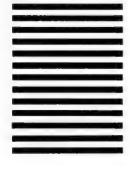
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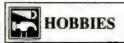
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AFTER HOURS



Adding the Personal Touch to Your Holiday Greetings

BY M. STEPHANIE RICKS

Good things come in small packages, and Broderbund's Holiday Edition clip art is no exception. This supplementary program lets you add seasonal touches to greeting cards, letterheads, banners, and signs you create with The Print Shop, also from Broderbund.

The Print Shop graphics package is easy to use. The main menu lists the format choices (card, banner, and so forth); all you have to do is choose one using the cursor keys or a joystick. Then size and position graphic items, select lettering (Deco, Block, Typewriter, and Stencil font styles are just some that are included), and type in a festive message. It's that simple.

Once you have copied the Holiday Edition files into The Print Shop directory, you can choose from among more than 100 graphic items. Holiday Edition boosts The Print Shop's collection of graphics with choices like Hanukkah menorahs, Christmas holly and wreaths, and a plump baby New

Year. There are also icons for the Chinese New Year, Martin Luther King Day, Mexico's Independence Day, Mardi Gras, and Arbor Day.

If that's not enough for you, you can create your own images or modify existing ones in *The Print Shop*'s Graphic Editor. Here, on-screen instructions clearly outline how to alter icons and font elements. Note that original and altered graphic items must be saved to disk before they can be used.

While half the fun of this is to design everything yourself, The Print Shop is equipped with predesigned templates that you can personalize if you're pressed for time or suffering from "creativity brain drain."

There is one glitch in *The Print Shop* that could make your holiday designing festivities somewhat less than jolly. If you switch to another font (for example, a wider one) after typing in your message, you may lose parts of the text. This means you'll have to rekeystroke missing punctuation marks and word endings, a tedious and tiresome process.

With colored printer paper and printer ribbons, you can further enhance your designs. (The Print Shop thoughtfully includes a stack of red printer paper and envelopes.) The output is determined mostly by your printer's capabilities and your ingenuity. My test printouts

were rather handsome, with crisp lettering and attractive graphics.

The days of construction paper, water-soluble paste, stencils, and round-tipped scissors are long gone. The Print Shop, Holiday Edition, and a little imagination all combine to give Hallmark some pretty stiff competition—you.

List Price: Holiday Edition, \$34.95; The Print Shop, \$59.95. Requires: 128K RAM, EGA card, DOS 2.0 or later. Copy protected. Broderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101; (415) 492-3200.

CIRCLE 689 ON READER SERVICE CARD



NewsQuest: A Fun Way to Develop Your Child's Nose for News

BY STEPHANIE IZAREK

Are you constantly lecturing your children on the importance of being aware of world events, only to be ignored because they are too busy playing *Tetris* on your computer? Then this holiday season, you should consider giving them a subscription to Time Inc.'s NewsQuest quiz game. It's the computer equivalent of those cereals that taste great but have no sugar—your kids will be learning about global events, but it will be so much fun they'll hardly notice.

Each week a NewsQuest quiz disk, based on that Monday's issue of Time magazine, will arrive at your doorstep. The object of NewsQuest is to earn the prestigious title of "NewsHound" by identifying the speaker of a quote that's concealed in a box at the bottom of the screen.

To capture the title, you must answer questions, grouped in categories that correspond to the editorial departments of *Time* magazine, such as World,

Nation, or Entertainment. All questions start out as fill-in-the-blanks; each time you answer a question correctly (spelling counts) several letters of the hidden quote are revealed. If you answer incorrectly some letters already earned will disappear.

You are then faced with a choice: Will you risk some more letters for a hint, or should you change the format of the question to multiple choice? Be aware, though, that answering fill-in-the-blank questions correctly is worth more letters than multiple choice.

You cannot attempt to identify the speaker until you have answered at least ten questions correctly. If you then try to identify the source and fail, all the revealed letters will disappear and the game will end. The strategy is to keep answering questions until you are absolutely sure of the speaker's identity. There are no bonuses for answering correctly with fewer letters and no penalty for taking your time.

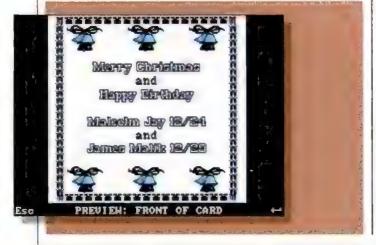
If you do so well as to be ordained a "NewsHound," you get the chance to wallow in even greater glory by racking up honor points for answering additional historical questions.

NewsQuest is also available for educational institutions. Schools can compete for up to \$10,000 in scholarships.

NewsQuest is not only an informative and educational game, it is highly addictive. The only problem is the steep price—\$89 plus postage and handling for a 30-week subscription that does not include a subscription to Time magazine. Unless you already subscribe to Time, plan on spending some additional money.

List Price: NewsQuest, \$89 for a 30-week subscription. Requires: 256K RAM, DOS 2.0 or later. Not copy protected. Time Inc., Time & Life Building, Rockefeller Center, New York, NY 10020; (212) 522-3319.

CIRCLE 686 ON READER SERVICE CARD







Coloring by Computer: An '80's Approach to an Old-fashioned Pastime

BY ALAN COHEN

Along with Salvation Army Santas and Perry Como specials, each holiday season brings with it a flood of new high-tech toys, all designed to win the hearts of children everywhere. While ColorMe: The Computer Coloring Kit (\$39.95 from Mindscape) may not be a GI Joe Doll that can do math, it adds a state-of-the-art twist to an old-fashioned pastime.

ColorMe allows the young artist, using a mouse, joystick, KoalaPad, or keyboard, to easily draw his own 16-color masterpieces.

ColorMe's drawing features are strictly no-frills. This is intentional, however; the program was designed to be easy to use, so children can spend more time drawing and less time figuring out sophisticated options.

By moving the cursor—which appears as a "crayon"—across the screen, lines can be drawn in any of four different thicknesses or styles. For example, the "scribble" crayon makes a fuzzy—as opposed to solid—mark. Text (choose from among four point sizes) can be easily mixed with the graphics, and a Fill feature colors in outlined shapes in one quick step. Mistakes can be undone instantly with an Oops option that erases the last paint stroke or color choice.

Using the Cut & Paste feature, predrawn pictures can be "cut" from picture disks (two are included with the program-one features characters from Rainbow Brite, the other stars the ColorMe Kids) and "pasted" onto a scene. Each of these stored pictures comes in two forms: colored-in and outlined. The outlined form allows the child to color in the picture to his or her own liking. A Big Dots feature, which zooms in on a selected portion of the screen, makes coloring even the smallest areas a snap.

And for those few rebellious children who prefer to do every last thing the old-fashioned way, Mindscape has included colored printer paper (a printout feature makes a hard copy of any picture) and, yes, even a box of crayons.

List Price: ColorMe: The Computer Coloring Kit, \$39.95. Requires: 256K RAM, CGA or EGA adapter, DOS 2.1 or later. Copy protected. Mindscape Inc., 3444 Dundee Rd., Northbrook, IL 60062; (800) 221-9884 outside IL; (312) 480-7667.

CIRCLE 687 ON READER SERVICE CARD



Monday Night Football You Can Play Anytime

BY GREG PASTRICK

What do you want this coming holiday season? If you're a fool for football, you're probably hoping your favorite team makes it into the play-offs and has a shot at the big one in January. But if it's looking like another disappointing season for the home team, you can reinvent some of this fall's gridiron gore or glory with John Elway's Quarterback.

Quarterback (\$29.99 from Melbourne House) puts you in command of the NFL team of your choice. You enter the league at a base starting salary. You advance your wages and player standing by matching strategy and moves against a programmed or live opponent.

You can select to play Quarterback at one of nine speeds, but the game is best when played at the faster speeds. There can be only one free-moving player, controlled by the user, on offense and defense. The movements of the other players are programmed.

Passing and kicking are accomplished by "point and release"; using a joystick or the keyboard, you point the cursor to the distance and direction you want the ball to travel and then release the fire button or key. Running, blocking, and tackling are simple matters of maneuvering the active player via the directional keypad or joystick. Active players can jump in all directions—useful for blocking kicks and passes, and gaining extra yardage.

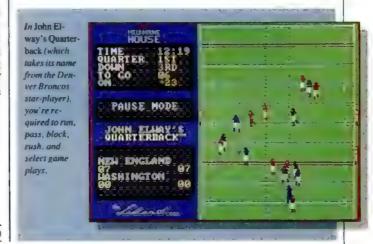
On offense, the passer/ball carrier has initial control at the line of scrimmage. There are 12 plays to choose from: based on play selection, the player has the option to pass, run, or improvise on a broken play.

On defense, the active player sets up as a linebacker against the offense, according to the play selected. The active player is also free to roam the field in search of sacks, interceptions, and open field tackles.

Quarterback is best played with two live opponents using joysticks. So many games are isolated affairs; it's refreshing to have a PC game that's active, involves strategy, and allows others to share the fun.

List Price: John Elway's Quarterback, \$29.99. Requires: 256K RAM, DOS 2.0 or later, joystick optional. Copy protected. Melbourne House, 711 W. 17th St., Unit G9, Costa Mesa, CA 92627; (714) 631-1001.

CIRCLE 688 ON READER SERVICE CARD



AFTER HOURS



Genealogy

(continues)

find it inconvenient to have to store the program and data files in separate subdirectories.

Genealogy DB has a good variety of output, including family group charts, a pedigree chart, two descendants charts, as well as numerous sorted lists. The 14-generation descendants chart—which can present up to 1,000 individuals on one long printout—is impressive, but how many families can trace their roots back to Pocahontas?

Genealogy DB also includes an option to print reports directly to an ASCII file. The file may then be edited and manipulated by a word processing program—just the ticket for including descendants charts in a family history.

List Price: Genealogy DB, \$95. Requires: 512K RAM, DOS 2.0 or later. Not copy protected. Geneware Inc., P.O. Box 872, Westminster, CA 92684; (714) 897-0492.

CIRCLE 691 ON READER SERVICE CARD

Lineage Master

Lineage Master is a commanddriven program that makes inputting your family data a very speedy process—once you get the hang of it.

Generally, one or two characters of a command are all that

are needed for *Lineage Master* to perform a function. Pressing E, for example, brings up a full-screen edit, F finds a record, and A adds an individual.

Linking is automatic: while the computer assigns an ID number to each individual, you navigate by name and relationship. Once an individual is entered, the spouse may be added simply by typing AW (for add wife) or AH (for add husband). Similarly, children are added to a family with the AC command, parents with AP.

Some of the default events, like STP (Seal to Parents) and End (Endowment), are somewhat cryptic for those unfamiliar with the terms used in Mormon genealogy. Lineage Master does allow you to define event titles tailored to your own family circumstances.

Lineage Master is not tolerant of date formats. The year must be written numerically and the month field must consist of its first three alphabetical characters. The program can handle dates like "about 1820" or "after 1820", but it cannot deal with a range of years, as in "1820–1822".

Rather than having just one textual note for each person, they can be linked to specific events, such as a birth or death. This is ideal for citations and will even be appreciated by the professional genealogist.

When it comes to reports, Lineage Master produces both family group charts and a handsome pedigree chart, along with numerous alphabetical lists. However, some important reports, such as an Ahnentafel chart (a form of compressed pedigree), are missing.

Unfortunately, Lineage Master also cannot put multiple databases in the same subdirectory. Another inconvenience: the manual is supplied on a disk file that you must print yourself.

Lineage Master is written in dBASE III, and it executes more slowly on a 4.77-MHz PC than one would like. But on an AT-class computer screen, updates are almost instantaneous. Even on a slow PC, Lineage Master is production-oriented. There are short and powerful commands that can do things that other programs require dozens of key-

strokes to accomplish. The ZL (Zap Link) command, for example, can move a child from one family to another in just two keystrokes.

Of these two programs, Lineage Master has the better user interface because it employs names and relationships, rather than numbers, in its data entry and linking routines. Genealogy DB is the speedier of the two, and it boasts a nice variety of output. It could even be rated as a "buy," but beware of its reliance on you to remember ID numbers.

List Price: Lineage Master, \$79.
Requires: 256K RAM (hard disk and 8-MHz or faster computer recommended), DOS 2.0 or later.
Not copy protected. Geneal.ogic Systems; 140 W. 900 South, Orem, UT 84058; (800) 336-6644.

CIRCLE 690 ON READER SERVICE CARD

Roots III: The Next Generation

In the July 1988 issue, we took a hard look at *Roots II* and were impressed. Now there's a new addition to the Commsoft family: *Roots III* is the hale and hardy offspring that incorporates many of the features that we, and you, wanted to see in *Roots II*.

For instance, there's now an easy way to enter children into a file. Once you enter the events pertaining to the parents, a keystroke brings up their marriage record; from that screen you can add the children. As a time-saver, certain items such as a child's birthplace will default to an existing value, such as the birthplace of its sibling; this may be easily changed.

Roots III will handle more than 65,000 individual and 65,000 marriage records. There's even a way to keep multiple databases in the same subdirectory, although you'll have to exit and restart the program to switch from one to another.

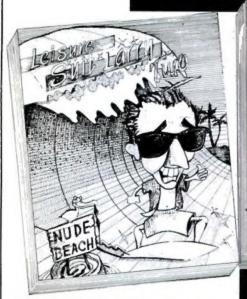
There are more reports—at least a dozen—including a 6-generation pedigree and a 90-generation descendants chart (that should take you back to about 300 B.C.). And you can get to them faster. In fact, you can get to everything faster with the new expert mode. An Alt-key combination usually takes you right where you want to go.

One of the features most requested by professionals was the ability to annotate each event. In *Roots III* you can attach notes and citations to any field.

There's also a new optional utility program called Revent, which has a calendar of 3,000 historical occurrences so you can link your own family's history with major events.

Roots III has gone up in price to \$250 (you can get a copy by calling Commsoft at (415) 967-1900), and it is not as easy to learn as Lineuge Master. But then again, it has few limitations. If Ben-Hur is one of your ancestors, Roots III can find a place for him.—Donald B. Trivette

Introducing the Newest Software Games - For Your PC



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With outrageous 3-D graphics, the incredible life-like animated characters bring the world of Leisure Suit Larry II to life in a way you never thought possible. They walk, talk, dance, flirt - even ignore some of your best pick-up lines ("What's your sign, babe?" 'Haven't we met before?'') just like in real

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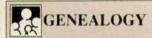
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AFTER HOURS



Family Ties: Help in Tracing Your Links with the Past

BY DONALD B. TRIVETTE

Where scribbled notes and scraps of paper in a dresser drawer served as the family record-keeping system of our grandparents, today's generation can use genealogy software to help them keep tabs on kin. A genealogy program is really a special database that lets you link (or "hook") children to parents, brothers to sisters, husbands to wives, and cousins to cousins. It ties family members together so tightly that no one gets lost in the socks drawer.

Of course, building a database of the (family) ties that bind can be a complex and timeconsuming procedure. You'll want a program that makes it easy to enter and edit data as well as to link individuals into families. And lastly, a program must generate complete and descriptive output reports.

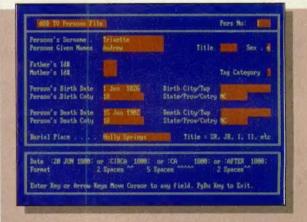
Some of the more-sophisticated (and more-expensive) packages, such as Family Reunion (reviewed in After Hours, July 1988) and Roots III (see sidebar), offer a plethora of features that will warm the hearts of the seasoned and/or professional genealogist. But the amateur genealogist might find that his needs are adequately met by the two low-end programs reviewed here, Genealogy DB and Lineage Master. Though they are not as feature-filled as their high-end competitors, the beginning genealogist may find their smaller price tags (about \$100 to \$150 less) appealing.

Genealogy DB

Genealogy DB, \$95 from Geneware, is a speedy little menu-driven program that offers a fair range of features and high-quality output. But be prepared to deal with a somewhat unfriendly user interface to get the results you want.

Birth and death events (or fields), as well as county, city, and state events are provided for each individual entrant. There's even a burial place field. To add new individuals to the file or to update old files, you need simply to move to the Persons and Notes sections of the program and fill in the genealogical data at the prompts.

Editing is a full-screen operation, so you can use the cursor keys to locate and change data anywhere on the screen. Dates are text fields that aren't limited to a specific type of data—for



Genealogy DB supports full-screen editing, so you can locate and change data in any fields on-screen.

instance, you can enter a birth date as Jan. 1, or even as Too Soon (a sly way of noting that the individual was born only 6 months after the wedding perhaps?).

Genealogy DB depends heavily on ID numbers, which it assigns in sequential order, to move from one individual's record to another's. It requires you to use these numbers to link a family together—for instance, there's no automatic add-achild routine. Each time you add a child to a family, you must enter the father's and the mother's ID numbers on the child's record; however, the ID numbers are not checked to see if

they are actually in the file.

Luckily, there is some help if you can't remember an ID number—just type a minus sign and the program enters its search-by-name mode. This lets you scroll through the file, name by name. The documentation suggests that you keep a printed list on hand to help identify individuals—not a bad idea.

Genealogy DB is written in the dBASE language and its file formats are in the dBASE standard. And the program is fast—the indexes are constantly updated so access to any record is quick. However, a professional genealogist, working on several families at once, will

'Tis the season to be jolly and PC Magazine joins in the festivities with holiday gift-giving ideas:
The Print Shop and

AFTER HOURS

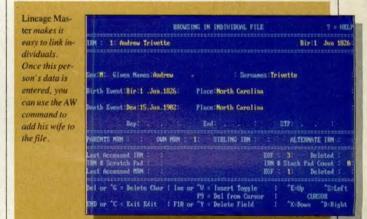
Holiday Graphics Edition Holiday greeting cards, signs, and banners

NewsQuest
Making current events fun
ColorMe: The Computer
Coloring Kit

An end to the Crayola?

John Elway's Quarterback

Armchair warm-up for Superbowl Sunday



THE INSIDE STORY. INSIDE.





THE INSIDE STORY. INSIDE.



